Vol. XIII. August, 1897. No. 2.

367147
AUG 12 1897
CENTENNIAL DEPOSIT

PAVING SEWERAGE MUNICIPAL ENGINEERING WATERWORKS PARKS

A MONTHLY MAGAZINE.

DEVOTED TO THE IMPROVEMENT OF CITIES.

GOOD ROADS, STREET CONSTRUCTION,
CLEANING AND LIGHTING,
SANITATION,
BRIDGES.

PUBLISHED BY
MUNICIPAL ENGINEERING COMPANY
INDIANAPOLIS NEW YORK

Two Dollars Per Year. Single Copies, 25 Cents.

ASPHALT PAVEMENTS

THE BARBER ASPHALT PAVING COMPANY

BOWLING GREEN BUILDING
No. 11 BROADWAY, NEW YORK

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1878

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Municipal Engineering

VOLUME XIII. AUGUST, EIGHTEEN NINETY-SEVEN. NUMBER 2.

SOLUBILITY OF THE ASPHALT HYDROCARBONS IN HEAVY PETROLEUM OIL.

By Clifford Richardson.

The commonest fallacy in regard to residuum or heavy petroleum oil is, perhaps, that it is not a solvent for the bitumen or hydrocarbons of asphalt. This idea was founded on the appearance of the asphaltic cement made with Trinidad refined asphalt and residuum oil. Trinidad refined asphalt is a mixture of mineral matter and bitumen. When this is melted and cold residuum oil added, as was the practice years ago, and is the careless practice in a few cases to-day, the cold oil causes part of the asphalt to solidify and granulate. The result is that the oil and asphalt apparently do not mix. In fact, under such circumstances, it takes some time for them to do so. When the oil is added hot, as it should be, or when the cold oil and hot asphalt are sufficiently heated and agitated until a thorough mixture has been brought about, the bitumen of the refined asphalt is dissolved, but at the same time it is rendered so much more thin and limpid in its melted condition that the mineral matter, with which it is mixed, can not so readily be held in suspension or so uniform a mixture be maintained as before. An inspection of the surface of the melted cement in this condition, therefore, shows a lack of entire uniformity in its appearance, which is due to currents of mineral matter, produced by the agitation, of different color from the purer portion of bitumen, which are freer from this substance on the immediate surface. To the casual observer this seems to be a separation or lack of mixture of the asphalt and residuum. This, then, is one of the grounds for the conclusion that residuum is not a solvent for Trinidad asphalt. In a more exaggerated form with no agitation the surface of a melted asphalt cement becomes so glassy and oily looking that it is assumed that this is due to a separation of oil.

The proof that in neither case is there a separation of residuum, and that the bitumen is soluble in the residuum, can be arrived at in two ways.

If oil rises to the surface of the melted cement when it is insufficiently agitated, it is only necessary to let it cool and solidify in this condition, when the oil must be found floating on top. This is never the case. The surface of a tank of melted Trinidad asphalt cement, which had been maintained in a melted condition for a week without agitation, and then allowed to cool, showed no signs of oil or the slightest greasiness. On examina-

tion of a section of the cement, it was found that the bottom contained 5 to 6 per cent. more mineral matter than the top, but that otherwise there was no difference in the consistency or character of the cement.

With Bermudez asphalt, which is comparatively free from mineral matter, the same experiment was conducted. The appearance of the melted surface showed currents which bore some resemblance to those observed in Trinidad asphalt cement, but less marked. They were, however, plainly due to differences in temperature of the material rising from the bottom and that on the surface. On cooling no separation of oil was found.

The most conclusive proof of the solubility of the bitumen of asphalts in residuum oil was reached by preparing the pure bitumen of both Trinidad and Bermudez asphalt. This was done by dissolving it in chloroform and removing everything insoluble by subsidation, filtering and the use of a centrifugal. With these pure bitumens the same percentage of the pure residuum, made as has been previously described, was mixed as would be used in practice in the preparation of an ordinary asphalt cement. There being no impurities present it was possible to determine, by examination of the resulting mixture under the microscope, with a very high-power objective, one-twelfth homogeneous immersion, whether solution had taken place or not. In each case a perfectly homogeneous substance was seen and entire solution had taken place.

Whether separation would take place with reduction of temperature or with age was then determined. When the residuum contained much paraffine scale there was very slight evidence of the presence of paraffine at temperatures below freezing, but ordinarily nothing separated.

After three years' preservation, at ordinary temperatures, the pure asphalt cement was as homogeneous and uniform as when first made. Solution still remained complete.

CONCLUSIONS.

The preceding experiments have shown that the common prejudices against the use of heavy petroleum oil as a fluxing agent for hard asphalt are not founded on fact.

Residuum oil contains, when free from contamination and carefully prepared, practically nothing soluble in water.

It is not the cause of decay in asphalts when used with them as a softening agent.

It is perfectly miscible with, and a satisfactory solvent for, asphalt.

It does not separate from asphalt cements when they are properly made.

It is composed to a very large extent of the most stable paraffine hydrocarbons.

It remains of very soft consistency, and of value as a fluxing agent, even after heating for many hours at high temperatures.

On the other hand, the malthas or asphaltic oils have been proved to be most unsatisfactory and unsuited for use as fluxing agents, because—

They are gradually changed in consistency on heating at the temperature at which asphalt cement is usually held when melted.

They are finally turned into glassy glance pitch having no fluxing value.

They are composed of unstable and easily volatile hydrocarbons.

They are neither fluxes nor asphalt.

They form a cement which can be maintained of no constant consistency, and which generally goes into the work upon which it is employed either too hard or too soft.

THE MODEL SYSTEM OF BOOKKEEPING FOR WATER COMPANIES. V.

THE VOUCHER RECORD.

The book in which a water company records its cash receipts is in the nature of things a simple affair, there being little opportunity for variation in its character. This is by no means the case, however, with the credit cash book, or voucher record, as there are many elements combined in its make-up which have an important bearing upon its form. A company may draw its water supply from a single source through a single large main, but the distribution of the supply is not so easily accomplished. And just in the same way it may draw its revenue almost exclusively from the sale of that water and have no difficulty in keeping a record of receipts, but find it a difficult matter to properly look after and classify the distribution of the funds expended. An ideal classification of expenditures will probably never be an accomplished fact, particularly as no two persons would agree as to what an ideal distribution is. One company insists upon keeping an accurate record of the amount of hemp used, while another includes in the incidental account such items of importance as valves and specials. Many companies keep a special account for telephone rentals, which is not used, as a rule, more than four times a year.

Of the many examples at hand of the methods which are in use, of keeping the voucher records, it it is a singular fact that nearly all of them are little more than the common single column cash book. There are exceptions to the rule however, in the shape of most excellent forms, patterned after modern ideas, and in every way admirable, but as a general rule there is great room for improvement and economy in the handling of this book of record.

To the skilled accountant an explanation of the principle of the column cash book may seem elementary in the extreme, but such a reader is reminded that there are many small water companies throughout the country whose book-keeper and cashier is also superintendent, and his training has frequently been such that he is more capable of properly performing the duties of the latter office than of the former. Nor is this condition of things altogether confined to the small companies. Many large ones are to-day using methods which seem to have been handed down from a former generation, and which, while good enough in their time, may now be improved upon very materially.

No especial argument is needed in defense of the column cash book. It has already won its way in many branches of business and there is no field wherein its usefulness is more patent than in the one under

consideration, and that it is not more generally used must be accounted for upon the ground that it is not fully understood. Theoretically the cash book is a mere memorandum of receipts and expenditures, which for convenience are separated from one another by different columns or pages. The ledger is the grand reservoir into which these memoranda are carried and grouped. The use of the two-column or two-page cash book makes it necessary to post all items separately or to take them off by groups and post the sum total of each. The latter is an improvement upon the former method, but the column cash book is still better. It simply provides an easy and effectual way of differentiating the entries at the time they are made, thus obviating all necessity of classifying them later at the risk of error in transcribing, and reducing the labor of posting to almost nothing, by reason of the fact that totals only are posted and those generally but once a month. This result is accomplished by dividing the book into a number of vertical columns, with suitable headings. These headings in turn may be grouped under more general ones, and these in turn still further classified if desired. What these headings shall be depends somewhat upon circumstances but more largely upon the judgment or fancy of the man who designs the book. No arbitrary rule can be laid down which will be applicable in all cases and under all conditions.

In general, it is well to remember that there is a limit to the extent to which the system may be carried, and that point is reached whenever the size of the book becomes so great as to cause a needless waste of paper or labor in handling it, because of numbers of columns which are seldom used, and for which, on that account, there is no real necessity. Entries of this kind, infrequent of occurrence, and yet which, because of their nature or importance, can not properly be thrown into a sundry or incidental column, should be carried to some particular column dedicated to the use of miscellaneous entries only, and then all such entries should be posted, separately, to their proper accounts, not by footings, as in the case of the other columns. Once the principle is understood it is not a difficult matter in any particular case to decide what is and what is not needed. A large double crown book, upon a double page, will accommodate about sixty columns of sufficient width to admit of the writing of three figures in the dollar column. This is ordinarily ample for the needs of a water company, though it is not uncommon to still further increase the number of columns at the expense of their width, or to use larger paper. Most companies have a smaller distribution rather than the contrary. The Salt Lake City water company makes a very large separation of the accounts of supplies issued from the company storehouse, by altering the direction of the column. The classification or heading is placed at the left, on the edge of a large sheet, there being 31 vertical columns to the page, one for each day of the month. The pages are not bound while in use and there may be as many of them as are needed. There are, in fact, in this case, three sheets, upon which there are over one hundred lines, and each line may be made to show the amount chargeable to some particular account for each day of the month for supplies issued from the store-house.

A full description of the voucher

GRANITE PAVEMENT, OLIVE ST., ST. LOUIS.

records of a number of companies would doubtless prove of interest, and the better parts of each might be profitably dwelt upon, but space forbids anything more than brief mention of two of the most elaborate ones now at hand. Attention is called to the points of difference as well as the resemblances.

The record of the Salt Lake City Water Company is a very complete one, and is one of the best of this class which has come under notice. It is upon a very large sheet (17 in. x 55 in. open), and is ruled with 64 vertical columns of various widths. It is called "Abstract of Vouchers and Pay-rolls approved, showing Expenses, etc., incurred during Month of ——, 189–." The first column heading reads, "Date of Voucher;" the next, "Department No."; the next, "Warrant No."; next, "Date Paid," a wide column; "Whose Favor," a narrower one; "Amount," and another wide one, headed "Item," for descriptions of the article purchased, or the character of service paid for. The remainder of the space is separated into five principal divisions, under the general titles, "Maintenance of Systems," "Construction," "Improvements," "Open Accounts," and "Summary." The subdivisions under the heading, "Maintenance," include special columns for "City Creek," "Emigration", "Parley's," "Repairs to Pipe Lines," "Repairs General," "Stationery and Printing," "General Expense," "Flushing," "Labor," "Stable Account," "Insurance" and "Extinguishing Fires," six columns being left blank so that headings may be written in and varied from time to time.

Under the general heading "Construction" there are the following sub-heads: "Water Mains," "Regular Extensions," "Special Extensions," "Buildings," "Tanks and Tank Houses," "Reservoirs," and several blank columns. The "Improvement" division comprises the sub-heads "New Services," "Brick Boxes," "Wooden Boxes," "Setting Valves, Hydrants, etc.," "Developing Water," "Parley's Canon," "City Creek Canon," Emigration Canon," and "Lowering Mains." The "Open Accounts" include "Storehouse," "Individuals and Companies," "Police Department," "Health Department," "Crematory Department," "Engineering Department," "Watermaster Department," "Street Department," "Fire Department," and "Joint City and County Building." The last group of headings to the right is devoted to the "Summary," under which are columns for "Total Maintenance," "Total Construction," "Total Improvements," "Total Open Accounts," and a blank column.

It is well to bear in mind that while in many respects a very complete and extended classification, such as the one given is desirable, there are attendant drawbacks, the chief one being that the ruling and printing of such a large form is quite expensive, and that it can not be bound in book form to advantage, and this makes it inconvenient to handle. The form submitted by the Salt Lake Company is ruled upon one side only, is made on two sheets pasted together, and is to all appearances designed to be used and filed away unbound in separate sheets.

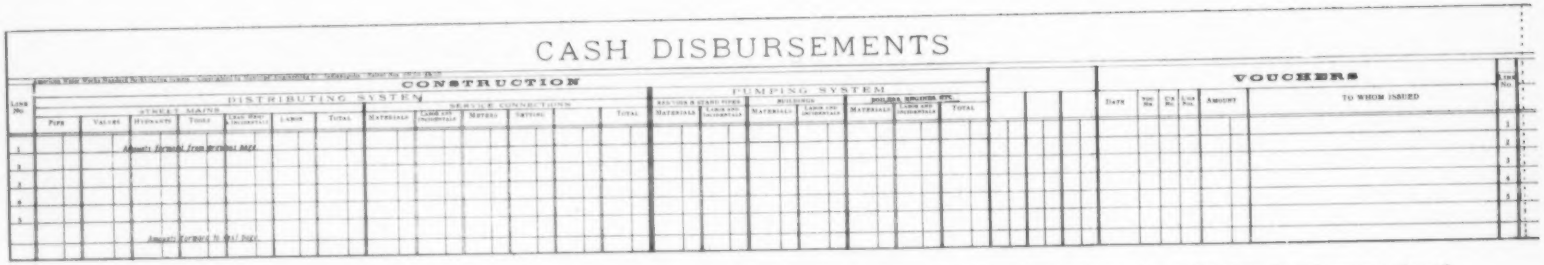
The water company at Atchison, Kansas, uses a book with a large double page, which is divided into five main divisions. After columns for date, number of voucher, journal folio and amount, the following headings are grouped under "General Expense;" "Officers'

TELFORD PAVEMENT, WESTMINSTER PLACE, ST. LOUIS.

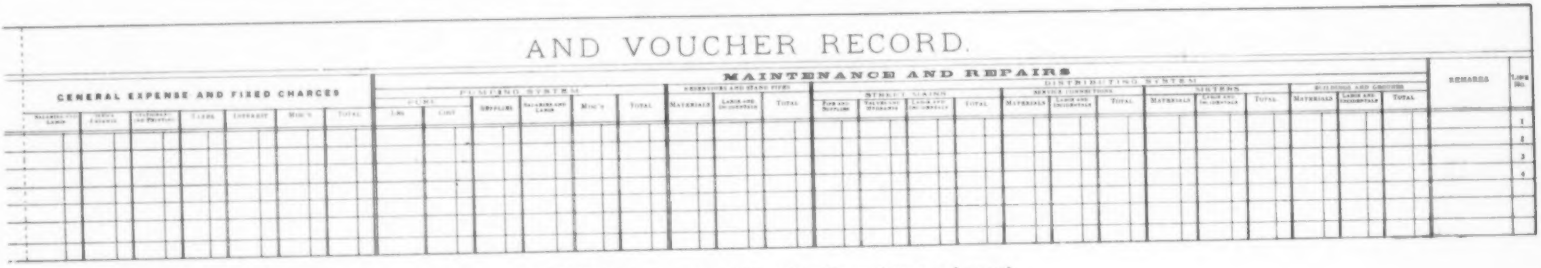
Salaries and Expenses;" "Office Furniture;" "Rent, Light, Fuel, etc.;" "Printing, Stationery, Postage, etc.;" "Horse and Buggy;" "Taxes;" Insurance;" "Telephone Rent;" "City License," and "Petty Expenses and Incidentals." "Operating Expense" includes separate columns for "Salaries of Engineers and Assistants;" "Repair of Tools and Machinery;" "Petty Expenses and Incidentals;" "Printing, Stationery and Advertising;" "Repairs of Pump House;" "Inlet and River Work;" "Repairs Furnace and Boilers;" "Gas Bills;" "Cleaning and Repairing Reservoirs;" "Ice;" two columns blank. Four general columns are assigned to "Interest," "Water Pipe," "Coal" and "Property." Under the general heading, "Pipe System," are grouped, "Repairs Valves and Valve Boxes," "Repairs Fire Hydrants," "Horse and Wagon," "Labor, Tools and Materials for Repairs," and two blank columns. Meters "In Stock" and "In Service" are given another heading, and finally, "Extension Pipe System" is assigned five columns, "Labor," "Material" and three blank. The book is very well gotten up and in appearance compares favorably with any that have been seen.

In the June number of MUNICIPAL ENGINEERING mention was made of a detailed daily record of receipts used by the city of Binghamton, N. Y. A similar record is kept of expenditures upon a page corresponding in size and general make-up with that already described. One page is devoted to each month's record. There are thirty-one numbered horizontal lines, one for each day, and there are vertical columns, with headings, by means of which the amount expended upon each particular account for any day or days may be instantly ascertained. These accounts, as indicated by the headings, are as follows: "Office and Superintendence," "Pumping Service," "Construction," "Relaying Street Mains," "Meters Purchased," "Water Rents Refunded," "Amount Paid on Bonds," "Interest Paid on Bonds," "Sundry Expenses," "Total Expenditures." At the foot of the page is a line upon which is carried forward the totals of expenditures for the current fiscal year, which are added to those of the current month and again carried forward until the end of the year.

The voucher record of the American water-works standard bookkeeping system, which was devised after a careful study of many of the forms now in use, is shown in the illustration accompanying this article. In it the items of expenditure are classified under three general headings, "Construction," "General Expense and Fixed Charges" and "Maintenance and Repairs." Three columns are left blank, which can be used for personal accounts, or other special accounts not otherwise provided for. When an item is entered in the record, the total amount of the voucher is inserted under the "Amount" column, next to the name of the payee. At the same time, the amount is distributed in the proper proportion among the various accounts to which it is to be charged, as indicated by the headings. For instance, a voucher is issued for $226, to John Doe, cashier, account of payroll. The date, amount ($226), number of check and name are inserted in their proper place under the general heading, "Vouchers." $44 is charged to construction of distributing system upon street



Cash Disbursement and Voucher Record (first page) of The American Water-Works Standard Bookkeeping System. Form No. 256; double page; size of book when open, 18x46 inches.



Cash Disbursement and Voucher Record (second page).

mains, $28 to service connections, $8 to setting meters, $50 to office salaries (general expense), $35 to salary engineer and assistant (maintenance), $23 to labor upon reservoirs, and $38 to labor upon street mains.

The sum of these entries must of course equal the total amount as shown by the column first named. In this way the book is always kept in balance. The sum of all the entries upon the double page must at all times correspond with the sum of the "Amount" column under the "Voucher" heading. At the end of each month the footings of each column are posted to the corresponding accounts in the general ledger. There may be a ledger account for each of the minor headings, street main pipe, street main valves, and so on, but generally these accounts are grouped and posted by a single entry to one account which includes them all. Whenever items are charged out that do not properly belong to any specific heading, they should be carried to the "Miscellaneous" column under general expense, and posted separately. Accounts with individuals would come under this head.

CEMENT PAVING IN EUROPE.

By Robert Grimshaw, C. E.

Cement concrete paving has not yet been very widely or very long used; principally in French cities. It was employed in Grenoble in 1869. The results, where it has been tried, have been such as to warrant Prof. Loewe, of the Munich Technical High School, in saying that it would appear that it is likely to supplant all other materials tried for street paving. It is without question that concrete can be employed wherever durability, cheapness of maintenance and cleanliness and convenience come in as desirable qualities. The cost of laying is, in Germany, only half that of wood pavement.

In laying it, the road-bed is brought to the desired profiles, axial and cross; then a layer of broken stone is applied, next comes one of beton concrete, which for well-traveled streets is 15 to 20 cm. = 6 to 8 inches thick —the proportions being one part by measure of cement to nine of stony material. The concrete is well compacted and evened off to profile. This serves as a bed for the surface-layer, which consists of cement mortar of equal parts by measure of cement and sharp, not too fine, quartz sand, and is from 2 to 5 cm. = 0.8 to 2.0 inches thick. This layer must be applied while the lower concrete layer is still wet. Then comes ramming and rolling.

As soon as the cement facing has sufficiently set, and sand-grains no longer stick to it (*i. e.*, after a few hours, according to wind and moisture and temperature of the air), there is spread on it a layer of sand 10 cm. = say 4 inches, which is thoroughly wet. This is to prevent cracks in the cement, and also aids in producing an even dark color for the mass below. It is recommended that the street be closed to vehicles for twenty days; but if this is not possible, then the street should be covered with close

TELFORD PAVEMENT, LINDELL BOULEVARD, ST. LOUIS.

planking over its entire width. In this way it was possible in Grenoble to open the street for traffic at once; the paving itself lasted fifteen years.

An expert in Grenoble states that despite the interruption of traffic, where the stone paving was replaced by cement, the people not only submitted willingly to this inconvenience, but now consider that a delay, even of forty days, would have been amply compensated by the long period of fifteen years, during which there was no interruption caused by repairs or work on the concrete. Nevertheless, at a later period, in order to lessen as far as possible the inconvenience of delays, the fresh concrete was covered with inch and a quarter poplar planks, so that the new streets could be used at once. This lasts about two months, at the end of which time the concrete has got so hard as to bear even the heaviest wagons. It is estimated that the wood covering costs 1 franc per square meter, or (reckoning the franc at 18.8 cents) 15.72 cents per square yard, bringing the cost of the pavement up from 10 francs to 11 per square meter (say $1.57 to $1.73 per square yard). Loewe considers that lack of success with cement paving is and can be due only to bad quality of the cement, and ignorance or dishonesty of the contractor or superintendent.

It must not be forgotten, however, that by reason of its comparatively low crushing strength, cement concrete pavement of the kind above described can stand only medium heavy traffic.

EXPERIMENTS IN WATER FILTRATION AT ST. LOUIS.

To the Editor of Municipal Engineering:

Under "Current Information", on page 377, volume 12, No. 6, June, 1897, appears an article entitled "Experiments in Water Filtration," which intimates that the investigations of mechanical filters by the water commission at St. Louis, Mo., have come to a successful end, and that certain filters and methods have been recommended for the use of the city. We are interested in mechanical filtration, and, realizing the probable value of the results obtained by last year's experiments by the water commission, wish to get data concerning them. Can you help us in the matter by giving us further information?

MACK MANUFACTURING COMPANY,
A. W. SEWALL, Manager.

Pittsburg, June 10, 1897.

In response to a request for further information regarding the St. Louis plans and experiments, Mr. M. L. Holman, water commissioner of St. Louis, has sent us copies of the official documents of the department explaining his position regarding western river waters that carry silt. This information comprises a description of the St. Louis method of filtration. In the clarification and purification of the water pumped from the river there is used a coagulant for the purpose of forming in the settled basins, a precipitate of the hidrated oxide of alumina. This precipitate is of a light floculent formation, and will, in settling to the bottom of the basins, remove, practically, all of the suspended inorganic matter and nearly all the coloring matter and bacteria. The use of the coagulant in proper amounts adds nothing to the water, but, on the contrary, removes nearly all of the foreign matter carried in suspension.

A mechanical filter plant for the filtration of the water thus treated is used. Experiments made by the water department show that dur-

ASPHALT PAVEMENT, McPHERSON AVENUE, ST. LOUIS.

ing the high stages of the river it is not possible to remove the coloring matter without the action of a coagulant. The experiments further show that when the water is once handled, by introducing the proper amount of coagulant, viz., from one part in twenty thousand to one part in one hundred thousand, by weight, according to the amount of matter in supension, that rapid filtration will give a clear, pure water.

As to the slow method of filtration, generally called the English system, the experimental experience of the water department leads to the conclusion that filtration on that line is not practicable; first, on account of the large amount of clay and sand carried in the water, and, second, because the water is too pure to form the film and slime on the surface of the sand before the filter has become choked with clay and very fine sand in the water; third, because the clay in the water penetrates to such a depth in the sand of the filter that the scraping to renew the surface would require the removal of too large an amount of sand.

The total cost of the entire filtering plant, including the work incidental thereto, is estimated at $3,000,000. The expense of operation is estimated at ten dollars per million U. S. gallons.

"As to my reasons for favoring filtration," Mr. Holman says, "I regard it as a matter of only a short time when the large cities of the United States will be under the necessity of adopting filtration in order to secure protection against water-borne diseases and the commercial advantage arising from having a water supply beyond suspicion as to potability and criticism as to appearance."

As to the general action of sulphate of alumina as a coagulant a copy of the report of John F. Wixford, chemist of the water department, is set forth for the information of those who may desire to take up the matter in detail, as follows:

On June 19, 1896, I made hardness determinations on the hydrant water as it came from the laboratory tap, on hydrant water after fifteen hours settling alone, and on the same water after fifteen hours settling with a coagulant. The coagulant used was sulphate of alumina, and was added in the ratio of one part coagulant to 10,000 parts water by weight. The results are given below in Clark's degrees:

	Temporary hardness.	Permanent hardness.	Total hardness.
(1) Hydrant water plain and simple	1.5°	6.5°	8.0°
(2) Hydrant water settled 15 hours without coag	1.5°	6.5°	8.0°
(3) Hydrant water settled 15 hours with coagulant ratio 1-10000	1.0°	7.2°	8.2°

The slight decrease in temporary hardness between the hydrant water and coagulated water is not in accordance with the ordinary theory on the subject of coagulation, namely, that the bicarbonate of lime held in solution by the water acts upon the sulphate of alumina, forming sulphate of lime which dissolves, carbon dioxide which also dissolves, and hydroxide of alumina which is precipitated and causes coagulation of the suspended matter. If the bicarbonate of lime alone causes the decomposition of the sulphate of alumina, it would require several degrees of temporary hardness to affect the decomposition of so large a portion as one pint of sulphate of alumina to 10,000 pints of water, while the results show that only 0.5° of temporary hardness was used up. This anomaly led me to suspect that there were other compounds in the water besides the bicarbonate of lime which decomposed sulphate of alumina. In line with this subject, I made a series of experiments on June 29, 1896, mainly, however, to determine how much sulphate of alumina could be added to the water before any of the undecomposed salt remains in the water. The results of these experiments are given in table top of page 82.

From these experiments it will be seen that one can add to such water as was in the river, on June 29th, 1896, sulphate alumina, in the ratio of 1 to 3,000, before there is any undecomposed sulphate of alumina in the water.

To determine whether the decomposition of so much sulphate of alumina by the water was due to matter in suspension or compounds dissolved in the water was the next step, and to this end a series of ex-

IMPROVED TELFORD PAVEMENT, DELMAR BOULEVARD, ST. LOUIS.

No. of sample.	Date collected.	Place.	Time settled.	Ratio coag to water.	Total solids	Sol. solids.	Hardness.	Oxygen consumed.	Test for sulphate of alumina.	Observations.
1	6-29-'96	River B's Pt.	None	No coag.	2000	249.2	.....	32	None.	
2	"	"	15 hrs.	"	....	....	8.9°	10	"	Settled well without coag.
3	"	"	"	1/30000	...	.....	9.1°	....	"	Some improvement.
4	"	"	"	1/40000	....	.....	9.5°	7	"	Decided improvement.
5	"	"	"	1/30000	....	.....	9.8°	....	"	Only slightly turbid.
6	"	"	"	1/25000	....	.....	9.9°	....	"	Nearly clear.
7	"	"	"	1/20000	....	.....	10.1°	....	"	Clearer.
8	"	"	"	1/15000	...	.....	10.6°	....	"	Still clearer.
9	"	"	"	1/10000	298	283.2	11.4°	6	"	Practically clear.
10	"	"	"	1/9000	....	.....	11.1°	....	"	Clear.
11	"	"	"	1/8000	....	.....	11.4°	....	"	"
12	"	"	"	1/7000	....	.....	11.0°	....	"	"
13	"	"	"	1/6000	....	...	11.5°	...	"	"
14	"	"	"	1/5000	....	.....	12.2°	....	"	"
15	"	"	"	1/4000	....	.....	12.8°	...	"	"
16	"	"	"	1/3000	...	.....	12.1°	...	"	"
17	"	"	"	1/2000	....	.....	16.3°	....	Present.	"
18	"	"	"	1/1500	.....	.....	.....	.....	"	"

periments was made on July 2d, 1896. The water used was clear water, from a Pasteur filter, which was attached to a hydrant at Harlem creek pumping station. The data and results are given in the following table:

From these experiments it will be seen that one can add one part of sulphate of alumina to 4,000 parts of water that has come through a Pasteur filter on the date mentioned, and shows that very little of the decomposition, if any, is due to matter in suspension, but that nearly all the compounds which decompose sulphate of alumina are in solution. It will also be noticed that the acidity increases gradually until the ratio of 1-3000 is reached, when there is a sudden increase, which must be

No. of exp.	Date.	Character of water.	Time settled.	Ratio of coag. to water.	Test for alumina sulphate.	Acidity in cubic centimeters of decinormal alkali.	Acidity in cubic centimeters of decinormal potassium hydrate after boiling water.
1	7-2-96	Distilled	.....	No. coag.	None.	0.12 c. c.	None.
2	"	Pasteur	.....	"	"	0.04 "	Alkaline.
3	"	Filter	15 hrs	1/30000	"	0.08 "	"
4	"	water	"	1/10000	"	0.08 "	"
5	"	"	"	1/30000	"	0.08 "	"
6	"	"	"	1/20000	"	0.12 "	"
7	"	"	"	1/15000	"	0.12 "	"
8	"	"	"	1/10000	"	0.16 "	"
9	"	"	"	1/9000	"	0.16 "	"
10	"	"	"	1/8000	"	0.20 "	"
11	"	"	"	1/7000	"	0.24 "	"
12	"	"	"	1/6000	"	0.32 "	"
13	"	"	"	1/5000	"	0.40 "	"
14	"	"	"	1/4000	"	0.48 "	"
15	"	"	"	1/3000	Present	0.80 "	0.6 c. c.
16	"	"	"	1/2000	"	Decided.	2.0 c. c.

SCENE IN FOREST PARK, ST. LOUIS.

construed to mean that there is undecomposed sulphate of alumina present, because on boiling all the samples having a smaller ratio than 1-3000, they turned alkaline, and those having the ratio of 1-3000 and 1-2000 remained acid. Moreover, the fact that those samples which did not contain undecomposed sulphate of alumina turned alkaline on boiling shows that the whole acidity was due to carbonic acid which was decomposed and liberated as carbon dioxide on boiling. Again, in those samples which did contain undecomposed sulphate of alumina, the fact that they remain acid on boiling shows that the original acidity was only in part due to carbonic acid, but mainly due to undecomposed sulphate of alumina, which itself reacts acid and remains acid on boiling.

The test for undecomposed sulphate of alumina in the above experiments consists in adding a few drops of saturated solution of sulphate of alumina to the clear water after coagulation. If a precipitate of hydroxide of alumina forms, it is certain that there is still something in the water which will decompose sulphate of alumina, and shows that the coagulant was not added in excess. If no precipitate of hydroxide of alumina occurs, it shows that there is nothing left in the water that will decompose sulphate of alumina, and consequently enough or more than enough of the coagulant has been added to the water to combine with everything that decomposes it. This last requires that the sample operated on be perfectly clear, else it is hard to see the precipitate; still, if the sample operated on is clear, the test is conclusive.

Another test which grew out of the experiments will now be given. From what has been said it will be gleaned that, if a coagulated water, to which an excess of sulphate of alumina has been added, is boiled, it remains acid; but if not sufficient coagulant has been added to decompose everything which destroys sulphate of alumina and the water is boiled, it becomes alkaline. Now, then, if to any coagulated water a few drops of an alcoholic solution of phenol-phtalein be added and the water be boiled, a rose-red color will appear, if there is still anything on the water that destroys sulphate of alumina and shows absence of any undecomposed coagulant. If no rose-red color appears on boiling, it shows that undecomposed sulphate of alumina is present. This test is very delicate and, as I have never seen it written, I wish to lay a very modest claim to it. The rational of the test of course is that all normal carbonates of the alkalies and alkaline earths in solution give an alkaline reaction, and all the salts of aluminum in solution give an acid reaction, it is impossible for an ordinary salt of alumina and any of the carbonates mentioned to exist at the same time, and as such, in the water. The presence of carbonates in the undecomposed state precludes the presence of an undecomposed salt of alumina, and *vice versa*. The test is only a new application of a well-known and a very delicate test for alkalinity.

From what has been given above, the most important conclusion which comes to light is that there are times when one can add as much as one part of sulphate of alumina to three thousand parts of water before any undecomposed sulphate of alumina remains in the water. As I know of no very exact analysis of the river water, it is impossible to say how much sulphate of alumina is decomposed by each separate constituent in the water, but from general considerations, it is safe to state that, when sulphate of alumina is added to the water, the carbonates of ammonium, sodium, potassium, calcium, magnesium and perhaps others, react, with the sulphates of alumina, forming sulphates of alkalies and alkaline earths which dissolve in the water; setting free carbon dioxide, which also dissolves, forming carbonic acid; and liberating hydroxide of alumina, which is insoluble, and is the direct cause of coagulation. The hydroxide of alumina has the property of bringing the suspended matter together in aggregations, which subside along with the hydroxide that holds them together.

Then in coagulating this water the most important point to consider is that by this means one is enabled to get rid of the mud, and this is certainly a desirable accomplishment. As for the chemical changes in the soluable constituents, it seems to me they are of minor importance. The mud sometimes runs as high as 5,000 parts per 1,000,000. The soluble solids reach about 250 parts per 1,000,000, and of these soluable solids only 50 parts per 1,000,000 could be changed from carbonates to sulphates when such a high ratio as one part of sulphate of alumina to 10,000 parts of water is used. The slight increase in carbon dioxide, as far as drinking water goes, certainly improves it. If then, by changing 50 parts per 1,000,000 of carbonates to sulphates, one can remove 5,000 parts per 1,000,000 of mud, here certainly is a scheme for engineers to bank on, and yet I have taken the worst possible case, for on an average a change of 10 parts per 1,000,000 of carbonates to sulphates removes the mud, while, when the water is best, a change of 5 parts per 1,000,000 of carbonates to sulphates would be sufficient. The truth of the matter is that natural conditions themselves vary the composition of the water during the course of a year more than would the small amounts of sulphate of alumina used to coagulate.

BRICK PAVEMENT, EUCLID AVENUE, ST. LOUIS.

From a chemical standpoint I see nothing in this process of sedimentation, coagulation and filtration that need be feared, and for the water in question experience tends to show that is the only practical process. JOHN F. WIXFORD, Chemist.

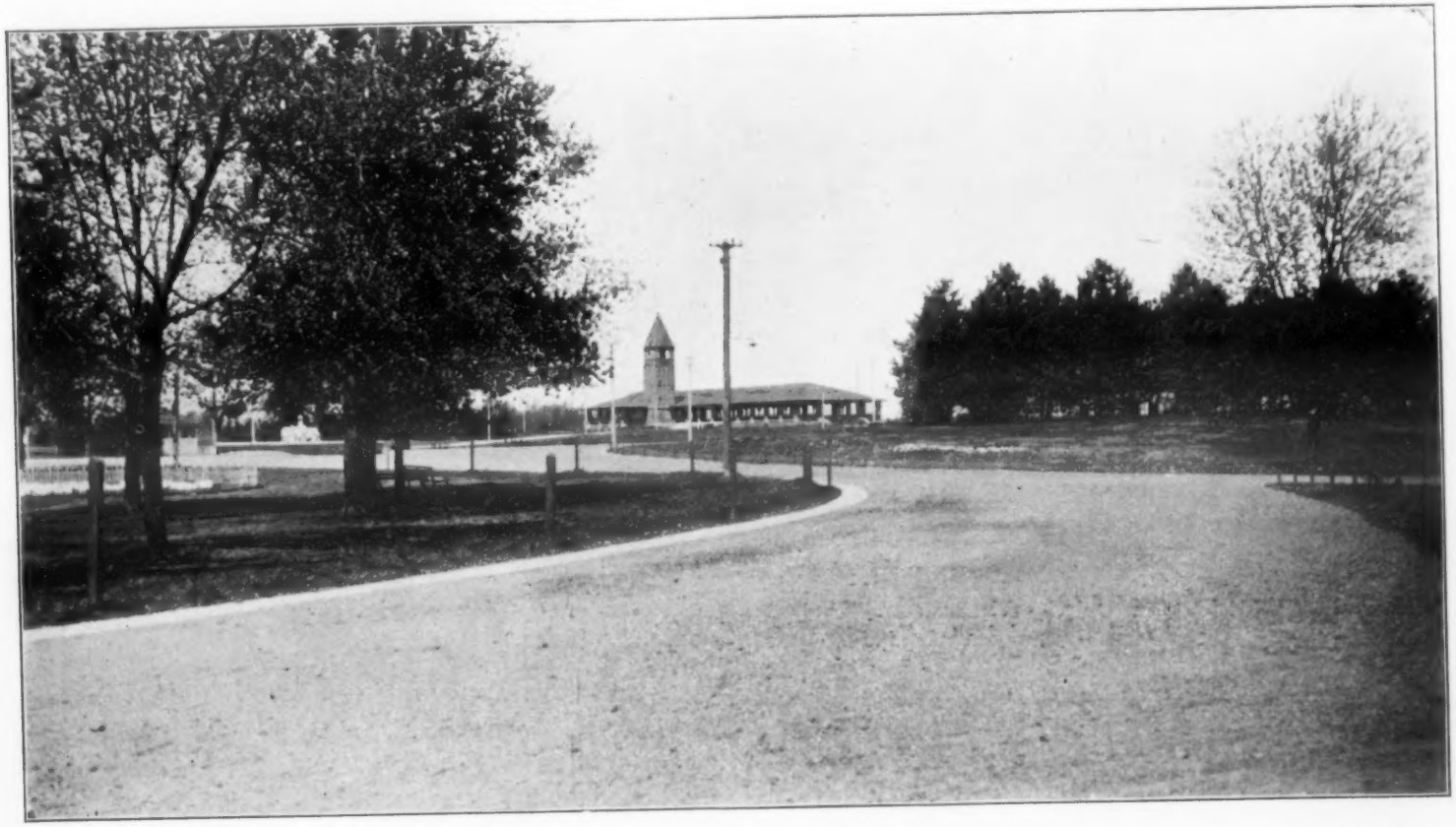
CAPACITIES OF WATER-WORKS SYSTEMS.

The accompanying section of the tables of water-works statistics, gathered by MUNICIPAL ENGINEERING, gives the physical data for the cities reporting whose population is less than 50,000 and over 20,000. As to pumping and resevoir capacity, it will be noted, concerning cities which obtain all their supply by pumping, that the average pumping capacity is four times the consumption. But one of the private supplies, Ottumwa, falls below a pumping capacity twice the consumption, while of city works, Newport, Ky., Sacramento, Cal., Decatur, Ill., and Poughkeepsie, N. Y., fall below that figure. Newport has twenty-eight days' reservoir capacity, and Poughkeepsie six days' reservoir capacity, to tide over serious accidents to pumping machinery. The eleven private works reporting have an average pumping capacity about 5.5 times the consumption, varying from 1.7 to 13.3, and the thirty-four city works have an average pumping capacity about 3.5 times the consumption, varying from 1.2 to 7.2. Of fifteen works with a gravity supply, the reservoir capacity varies from less than a half day's supply to 400 days. The city supplies have an average reservoir capacity twice the private supplies. Seven cities are supplied partly by gravity and partly by pumping, and have nearly the same average pumping capacity as the cities depending on pumps alone, in addition to their reservoir capacity.

The number of taps per mile varies about an average of 70, from 37 to 103, with a few exceptionally high ones, such as, Binghamton, with 107; Norfolk, 175; Jacksonville, 114; Newburgh, 171.

In some cases, doubtless, the mileage of strictly supply-mains is included with the distribution, but in systems depending on pumps, the mileage of supply-mains is a very small proportion of the total where the entire mileage can not be all classed in the distribution system.

The rates of consumption are apparently irregular, but there is possibly a slight connection between the percentage of metered taps and the consumption per capita. The average consumption per capita of the three cities having over 80 per cent. of the taps metered is 45 gallons; of six cities, between 60 and 80 per cent., 51 gallons; of three cities, between 40 and 60 per cent., 62 gallons; of five cities, between 20 and 40 per cent., 94 gallons; of thirty-nine cities, between 0 and 20 per cent., 84 gallons, and of sixteen cities, with no meters, or not stated, 116 gallons. The result between 20 and 40 per cent. is increased by three abnormally large rates of consumption in Kansas City, Kan., McKeesport and Leavenworth.



PARK ROAD IN FOREST PARK, ST. LOUIS.

STATISTICS OF CAPACITIES OF WATER-WORKS SYSTEMS IN CITIES OF LESS THAN 50,000 POPULATION.

City.	Pop.	System.	Ownership.	Reservoirs. No.	Reservoirs. Capacity, Gal.	Settling Basins. No.	Settling Basins. Capacity, Gallons.	Filter Plant. Capacity, Gal. a day	Filter Plant. Cost.	Capacity Pump'g Plant, gal. per day.	Consumption gal. per day. Average.	Consumption gal. per day. Per cap	Miles and Size of Water Mains. Distributing.	Miles and Size of Water Mains. Supply	Pressure. Ordinary	Pressure. Fire.	No. Hydrants	No. Taps.	No. Meters.	No. Fount'ns	No. Water Troughs.
Binghamton, N. Y.	45,000	Pump direct.	City.	....	.....	....	.....	.....	....	18,000,000	5,217,712	116	56 mi. 1" to 30"	.....	65	85	533	6000	425	....	6
Utica, N. Y.	44,007	Gravity.	Private.	....	800,000,000	....	.....	.....	....	.....	3,000,000	68	61 miles.	.....	30	130	362	3000	2500	....	.....
Kansas City, Kan.	42,000	Pump direct.	Private.	....	.....	4	60,000,000	.....	....	.....	2,000,000	174	25 mi. 4" to 20"	2 mi. 24 in.	100	130	300	1650	400	0	10
Dubuque, Iowa	40,000	Gravity and pump.	Private.	2	1,500,000	0	.....	.....	.....	.....	.....	...	40 mi. 6" to 16"	.....	40 to 100	40 to 100	123	1600	25	9	7
Elizabeth, N. J.	40,000	Reservoir and pump to standpipe.	Private.	1	150,000,000	1	50,000,000	.....	....	8,000,000	4,000,000	100	75 miles.	.....	35	.....	260	5600	50	4	8
Norfolk, Va.	40,000	Pump direct.	City.	....	.....	2	9,000,000	.....	....	10,000,000	3,500,000	88	35 miles.	10mi. 20in. & 24in.	35	.....	205	6179	125	....	5
Quincy, Ill.	40,000	Pump to reservoir	Private.	1	22,000,000	....	.....	5,000,000	....	16,000,000	1,200,000	30	33.5 mi. 2" to 20"	.....	30 to 90	30 to 90	193	2269	705	....	2
Topeka, Kan.	38,600	Pump direct.	Private.	....	.....	....	.....	.....	....	13,000,000	1,500,000	40	38 mi. 4" to 18"	4 mi. 14 in. to 20 in.	80	125 to 145	320	2258	125	3	6
Akron, O.	35,000	Reservoir	Private.	1	5,000,000	....	.....	.....	.....	.....	3,000,000	87	45 mi. 4" to 20"	.....	40 to 80	.....	282	3175	125	2	2
Elmira, N. Y.	35,000	Gravity and pump to reservoir.	Private.	1	4,500,000	....	.....	9,000,000	....	8,500,000	3,500,000	100	46 mi. 4" to 20"	8000ft. 20in. & 16in.	55	55	346	3200	400	....	3
Ft. Worth, Tex.	35,000	Pump direct.	City.	4*	175,000,000	....	.....	.....	.....	13,000,000	3,150,000	90	52.9 mi. 4" to 36"	.....	40	80	465	2579	74	....	.....
Johnstown, Pa.	35,000	Gravity.	Private.	....	28,000,000	....	.....	.....	.....	.....	.....	....	88 miles.	18 mi. 12in. to 36in.	65	65	140	3800	0	4	4
Salem, Mass.	35,000	Pump.	City.	1	20,000,000	....	.....	.....	.....	10,000,000	2,500,000	62	60 mi. 4" to 12"	12 mi. 20in. & 30in.	142	142	415	6000	175	0	10
Bay City, Mich.	35,000	Pump direct.	City.	....	.....	....	.....	.....	.....	10,500,000	3,074,968	93	44 mi. 4" to 20"	4 mi. 30 in.	40	70 to 110	387	1851	559	5	11
Pawtucket, R. I. (65,000 supplied by works.)	35,000	Pump.	City.	2	38,000,000	....	.....	.....	.....	12,000,000	5,471,088	84	128 miles.	.....	70 to 130	70 to 130	916	7071	5089	....	26
Columbus, Ga.	30,000	Gravity.	Private.	2	120,000,000	1	.....	.....	....	.....	1,000,000	33	20 mi. 4" to 12"	3.5 mi. 12 in.	40	40	142	1395	1000	1	5
Montgomery, Ala.	30,000	Pump to standpipe and direct.	Private.	4	2,000,000	....	.....	.....	.....	6,000,000	1,333,900	44	40 mi. 3" to 24"	.....	50 to 100	60 to 110	250	2935	1353	2	6
Newport, Ky.	30,000	Pump to reservoir.	City.	....	65,000,000	1	.....	.....	.....	4,000,000	2,300,000	77	45 miles	.....	70 to 95	70	198	4600	200	0	.....
Sacramento, Cal.	30,000	Pump.	City.	....	.....	....	.....	.....	.....	10,000,000	6,000,000	2 0	48 miles.	.....	30 to 35	50	410	....	0	2	25
Sioux City, Iowa	30,000	Pump.	City.	1	1,500,000	....	.....	.....	.....	6,000,000	1,400,000	47	45 mi. 4" to 16"	.....	100 to 110	140	250	3500	300	....	.....
La Crosse, Wis.	28,763	Pump direct.	City.	....	.....	....	.....	.....	.....	16,500,000	3,484,400	121	29.3 miles.	.....	60	100	310	2650	3	20	18
Lexington, Ky.	28,000	Pump direct.	Private.	....	360,000,000	....	360,000,000	1,500,000	$27,000	3,000,000	1,250,000	45	18 miles.	.....	45	110 to 120	263	1385	1174	....	4
Oshkosh, Wis.	28,000	Pump direct.	Private.	1	1,000,000	....	.....	5,000,000	$30,000	.....	2,230,000	80	40 mi. 4" to 16"	.....	40	90 to 125	363	1479	38	0	7
Woonsocket, R. I.	28,000	Pump to standpipe.	City.	3†	2,000,000	....	.....	.....	.....	4,500,000	621,464	22	46 mi. 5" to 20"	.....	65 to 115	65 to 115	489	1865	1598	0	7
Newton, Mass.	27,590	Pump direct.	City.	2	17,500,000	....	.....	.....	.....	10,000,000	1,801,000	63	120 mi. 4" to 20"	20 in.	84	84	805	5917	4580	2	10
Decatur, Ill.	25,000	Pump direct.	City.	1	2,000,000	....	.....	.....	$200 a month.	3,000,000	2,500,000	100	30 miles.	10 miles.	.....	145	1348	8408	88	18	7
Jacksonville, Fla.	25,000	Pump direct.	City.	....	.....	....	.....	.....	.....	4,500,000	1,218,508	48	11 mi. 4" to 14"	.....	45	100	135	1250	445	....	.....
McKeesport, Pa.	25,000	.....	City.	1	5,000,000	....	.....	.....	.....	11,000,000	4,031,000	161	29 3 mi. 2" to 12"	.....	30 to 110	30 to 110	207	3101	470	7	7
Nashua, N. H.	25,000	Pump direct and to reservoir.	Private.	4	10,000,000	....	.....	.....	.....	16,000,000	3,500,000	140	55 mi. 4" to 24"	.....	50	80	225	4000	350	....	12
Newburgh, N. Y.	25,000	Gravity.	City.	....	.....	....	.....	.....	.....	.....	3,000,000	130	24 miles.	9 miles.	50	50	343	4086	....	....	10
Shamokin, Pa.	25,000	Gravity.	Private.	5	45,000,000	....	.....	.....	.....	.....	.....	...	40 mi. 4" to 12"	10mi. 14in. & 16in.	80	75	58	....	26	....	1
Superior, Wis.	25,000	Gravity and pump.	Private.	....	.....	....	.....	Now con	structg	6,000,000	1,600,000	64	10 mi. 4" to 16"	§	65	130	650	....	....	....	.....
Waco, Tex.	25,000	Gravity and pump.	Private.	....	100,000,000	....	.....	.....	.....	1,500,000	.....	...	47 mi. 2" to 16"	.....	40	70 to 75	218	3500	8	1	5
Elgin, Ill.	24,743	Pump direct and to standpipe.	City.	†	510,000	....	.....	.....	$2.80p'r mil.gal	9,000,000	1,560,000	63	38 mi. 6" to 24"	.....	65 to 98	100	333	2402	142	....	2
Leavenworth, Kan.	23,900	Pump to reservoir.	Private.	1	6,000,000	3	20,000,000	.....	.....	18,000,000	3,000,000	125	27 mi. 4" to 18"	.....	130	140	133	1440	420	2	7
Rockford, Ill.	23,580	Pump direct.	City.	1	1,100,000	0	.....	.....	.....	6,000,000	2,800,000	90	53 9 mi. 2" to 20"	0.5mi. 8in. to 16in.	45	80 to 100	366	2800	40	8	10
Kingston, N. Y.	23,000	Gravity.	City.	1	.....	....	.....	Gravel	filter.	.....	1,500,000	65	42.2 miles.	.....	65 to 140	.....	332	2750	88	....	5
Poughkeepsie, N. Y.	22,206	Pump to reservoir.	City.	....	12,000,000 res. & set. basin.	....	Filter 25' x 50' x 12', in 2 divisions.	2,000,000	$'4.000	3,000,000	1,900,000	86	18.89 miles.§§	1.54 mi.	40 to 120	40 to 120	354	2342	1353	....	.....
Anderson, Ind.	22,000	Pump direct.	City.	....	8,000,000	....	.....	.....	.....	.....	2,500,000	114	20 mi. 4" to 20"	.....	60	90 to 100	162	1200	5	9	5
Cedar Rapids, Iowa.	22,000	Pump direct.	Private.	....	.....	....	.....	3,000,000	$47,000	6,000,000	2,000,000	93	32 mi. 4" to 20"	.....	60	120	202	1900	25	1	.....
Quincy, Mass.	22,000	Pump to reservoir.	City.	....	.....	....	.....	.....	.....	4,000,000	904,152	41	63.1 miles.	.....	80	.....	332	2560	....	....	.....
Waltham, Mass.	22,000	Pump to reservoir.	City.	1	6,000,000	....	.....	.....	.....	3,000,000	1,300,000	60	48 mi. 4" to 24"	.....	55 to 60	55 to 60	285	3135	80	1	8
Winona, Minn.	22,000	Pump to standpipe.	City.	....	.....	....	.....	.....	.....	11,000,000	.....	...	30 mi. 6" to 32"	.....	45 to 60	93	300	2014	118	4	10
Pittsfield, Mass.	21,000	Gravity.	City.	4	2,000,000	....	.....	.....	.....	.....	1,500,000	71	52 mi. 3" to 10"	.....	60	60	175	3500	100	....	9
Atlantic City, N. J. (180,000 transient.)	20,000 res.	Pump to standpipes.	City.	....	.....	....	.....	.....	.....	11,500,000	450,000	va-ries	40.8 miles.	10.7 mi.	35 to 45	35 to 45	453	2400	1530	....	.....
Colorado Springs.	20,000	Gravity.	City.	6	1,200,000,000	....	.....	.....	.....	.....	3,000,000	300	55 mi. 3" to 20"	18mi. 8in. to 16in.	85 to 90	85 to 90	135	5000	....	....	10
Columbia, S. C.	20,000	Pump to reservoir.	City.	2	1,500,000	1	6,000,000	.....	.....	4,000,000	1,200,000	60	.....	.....	10 to 80	10 to 80	....	....	0	....	.....
Galesburg, Ill.	20,000	Pump direct.	City.	1	4,500,000	....	.....	.....	.....	3,000,000	750,000	37	20.8 mi. 4" to 16"	3.4mi. 10in to 16in.	40	120	251	800	600	....	5
Ottumwa, Iowa	20,000	Pump direct and gravity	Private.	....	.....	....	.....	Jewell gravity.	$25,000	2,500,000	1,500,000	75	25 mi. 4" to 24"	.....	80 to 100	100 to 140	152	1000	57	....	13
Plainfield, N. J.	20,000	Pump to standpipe.	Private.	†	515,000	....	.....	.....	.....	5,000,000	600,000	30	24 mi. 6" to 16"	.....	74	74	300	1300	20	4	5

*Dams. †Standpipes. ‖In 1887. §For 1890. §§In 1892.

THE QUESTION DEPARTMENT.

[By J. W. Howard, B. L., C. E., for MUNICIPAL ENGINEERING.]

RESIDUUM OF PETROLEUM AND ASPHALT PAVEMENT MIXTURE.

What kind of residuum of petroleum should I purchase? and what proportions of refined Trinidad asphalt residuum and sharp sand are used for street work? If my mixture is hot, can I get it smooth with a cold roller in warm weather? My rollers weigh from 350 to 1,000 pounds. I have never used asphalt residuum and sand mixtures, consequently do not know how stiff the mixture must be.

A. B. Nickerson, Norwich, Ct.

This question can not be answered in full, for that would involve many pages, also points which can only be explained by actual samples and personal experience. It is possible, however, to indicate the outline of a suitable residuum oil proper for the manufacture of aspnaltic cement. All lighter oils should have been removed until the following properties are found in the residuum purchased:

Specific gravity, by Beaumé scale, 18 to 22.

Flashing point 300 or higher.

It must flow to all temperatures above 60 F.

The pavement mixture is made by first compounding the asphalt cement from refined asphalt and the residuum oil, both heated to about 300, or a little more. The amount of residuum oil to each 100 pounds of asphalt varies with the climate, but seldom, if ever, is more than 21 pounds of residuum added to each 100 pounds of asphalt; generally less.

The pavement mixture is then made of asphaltic cement, 12 to 15 per cent.; sand (sharp, clean, free from clay, mud, etc.), 83 to 70 per cent.; powdered limestone (or known equivalent), 5 to 15 per cent.

Your rollers are all too light for properly compressing asphalt pavement upon roadways subjected to wagon traffic, although they may be used in connection with footwalk paving. It is not necessary to have heated rollers. Cold rollers do not stick to pavement surfaces, if the pavement is first dusted with a little dry hydraulic cement swept over with a broom.

The printed specifications for asphalt pavements, obtainable on request from the department of public works of the larger cities, would interest you.

TRINIDAD ASPHALT LAKE.

Are there two asphalt lakes on the Island of Trinidad.

——, *Commissioner, Newark.*

An examination of the large map of Trinidad, public documents and records, shows that there is but one lake of mineral pitch, or asphaltum, and that it is referred to in all descriptions, books of travel and legal documents, as the "pitch lake." It is almost circular, covering an area of a little more than 114 acres.

There are various small pools or springs of a bitumen-like dense petroleum, a few feet in diameter, of a material technically known as maltha, at several points on the island, but which is not, properly speaking, asphalt, nor has it there any commercial value.

There are also small, irregular and a few large detached masses or pockets of what is known as "land asphalt," in contradistinction from that which is found in the pitch lake, and called lake asphalt. These are situated at various places, especially in the southwest portion of the island, some being near the asphalt lake.

Glance pitch, which is a stiff and brittle bituminous substance, appears at a few places. It is a material which, if free from petroleum and naphtha, (which unfortunately generally impregnates it in Trini-

dad), is suitable for varnishes, but as glance pitch under the name of "Gilsonite" is found in Utah, and under other names in scores of other places throughout the world, this material in Trinidad has, at present, little or no commercial value.

There are asphalt deposits, known as "lakes," in Venezuela (Bermudez), Peru, as well as small pools and springs of softer bitumens elsewhere in Europe and America, all of various qualities.

CROSS-SECTION OF STREET ALONG A SIDE HILL.

Noticing the answer and suggested arrangement of gutters in your question department, page 32, in the July number of MUNICIPAL ENGINEERING MAGAZINE, I take the liberty to ask if there is no way by which the roadway can be made at the same height on both sides?

A. L. Quimby, Wheeling, W. Va.

Fig 3.

Yes, as indicated in this figure, which is numbered 3 so as to follow those you refer to in the July number. But this arrangement is not suited to climates like Canada, where the snow lies so long on the ground and where the seepage of water, freezing and thawing, would soon spoil the grass bank and walk on the upper side. It is, however, a very desirable arrangement in small towns in climates with moderate winters.

ASPHALT PAVEMENT AND HEALTH.

I notice, from the statistics of Buffalo, which I have lately examined, that in the face of the increase of population at a rate of twice as many births as deaths, the deaths have decreased as follows: From 6,001 in 1891 to 5,711 in 1893; 5,280 in 1894; 4,684 in 1895; 4,452 in 1896. As Buffalo has more asphalt pavement than any city in the world, is not this decrease in death-rate and the health and survival of children due first to asphalt pavements? It seems so to me.

T. B. Bunting, California.

Gen. Bunting's conclusions are in part correct, but it should be remembered that Buffalo has a supply of almost pure water, which is as essential to good health as the aseptic and antiseptic qualities of asphalt pavement, in so far as that pavement does not accumulate filth and makes it possible to properly clean the streets. However, in Buffalo the wind and rain play a large part in street cleaning.

SOFTNESS OF ASPHALT PAVEMENT.

Is the softness of asphalt pavement in summer an indication of poor quality and weakness?

B., New York.

Excessive softness, so that the pavement deforms to such an extent that it does not again take its original form under the wheels rolling over it, is an indication that the pavement is too soft, and that a mixture should be made from the materials used in compounding that special asphalt pavement, such that a stiffer pavement will result. As softness, density and ductility are closely related and essential in an asphalt pavement which is to successively withstand very cold weather and sudden temperature changes, it is therefore best to err on the side of having an asphalt pavement a little too soft, rather than too hard and brittle. Experience alone with different asphalts,

kinds of sand, various climates, etc., can teach just what degree of softness is permissible in an asphalt pavement. It naturally follows that what is suitable for one city and climate is not suitable for another.

SEWER GAS PREVENTION IN HOUSES.

On returning last fall to my house, several members of my family suffered from throat troubles and headaches, which the doctor thinks were caused by sewer gas. As the house has the best of plumbing, and was aired on our return after three months' absence, we can not account, for the gas. Can you suggest an explanation?

I. B. R., Norwich.

Probably the water in all the traps of the sinks, bowls, closets, etc., dried out and sewer gases had free access to your house, its furniture, tapestries, bedding and carpets, for many weeks. It could thus deposit various dangerous germs in quantities not removable by simple airing on your return. At intervals during the summer some one should enter the house and let the water run a short time at each bowl, closet, etc., to insure having water in the traps, or water seals of the waste-pipes.

[By Charles Carroll Brown, M. Am. Soc. C. E., for MUNICIPAL ENGINEERING.]

STRAINERS FOR RIVER WATER.

We wish a book that will give us detail plans for constructing strainers over mouth of a twelve-inch suction pipe to be placed in a river subject to heavy rises and muddy water. *Water Co.*

No book at hand seems to give details which would be satisfactory. Periodical literature seems to be almost as barren. A fuller knowledge of the conditions of the locality and of the water, and a statement in detail of the degree of purity required in the distribution system, would be necessary to determine how elaborate a filter or strainer would be necessary. More definite reference to descriptions of constructions could then be made.

CHARGES FOR ENGINEERING SERVICES.

Please state what an engineer should charge for preparing complete plans for a water-works system for a town of one thousand people. No difficulty of construction was found. What should he receive per day for superintending the construction of the above? Please give some figures, however vague the above may be. *W. C. B.*

Such questions are asked every day, and under the present conditions of the engineering profession in the way of competition with non-technical men with little education and restricted experience, and lack of appreciation of the value of really expert engineering advice in such cases, the answer is very likely to be, "all the board of trustees will stand; that amount will be too small under any ordinary circumstances." Attempts have been made by local combinations of engineers to fix schedules of prices, but they have seldom proved of any value, outside men being too easy to obtain, and expert assistance having too little value in the eyes of most employers, especially city and town officials. An attempt has been made to obtain some of these schedules, but they have not yet been received, and the subject will be further considered later. The question is so closely connected with that of the ethical standards of the profession that they must be considered together.

BY WAY OF COMMENT.

Water Filtration at Philadelphia.

The question of filtration of the water supply of Philadelphia has been under consideration for many years. A general ordinance on the subject was passed in 1892, and one defining the terms on which companies might make offers to the city to do the work was passed in January, 1896. Propositions have been numerous since that time.

In 1895 the daily consumption of water per capita in the city was 162 gallons, an increase of over thirty gallons in five years, a very large proportion of which is undoubtedly waste. The question of prevention of waste is closely allied with that of filtration, since the first will largely influence the expense of the second.

In 1895 the Philadelphia Water Supply Company proposed to supply the city with filtered water from the Delaware river for 60 per cent. of the gross revenues of the water department. This proposition is discussed on page 99 of the number of MUNICIPAL ENGINEERING for August, 1895. Further information as to details as now proposed indicates that the demands of the company are excessive, and should be materially reduced.

In September, 1895, the Women's Health Protective Association employed Mr. Allen Hazen to report upon water purification, and he recommended slow sand filtration of water from the various sources now in use, and estimated the cost at $3,391,000 for construction and $3.50 a million gallons of water filtered for maintenance, the capacity of the works being 195,000,000 gallons a day. The matter of waste prevention was brought into the computation, the consumption being assumed to be reduced from 162 to 100 gallons per capita per day. The scheme was therefore really designed for present uses and future growth was left for future provision.

About the same time the Pennsylvania Sanitation Company proposed to furnish water filtered by their process, now in use for filtering sewage at Reading, Pa. This proposition was recommended to the council for favorable consideration by the water committee, but the ordinance has not yet been passed.

A proposition to acquire the rights of the Schuylkill Navigation Company at a heavy cost was also introduced.

During these discussions an ordinance providing for a loan of $3,000,000 to furnish funds for the filtration works was introduced. This proposition now contains provision for about $3,700,000, including some money for West Philadelphia.

This spring the Schuylkill Valley Water Company proposed to furnish water filtered by slow sand filtration, and their chemist estimates the cost of maintenance at $1.60 to $2 a million gallons, a material reduction from Mr. Hazen's figure. This proposition has

also been recommended to the council for favorable consideration, by the water committee.

In all thirteen propositions have been presented, and the committee, apparently admitting its inability to decide the question, has finally recommended the entire thirteen to the council for favorable consideration.

All this difficulty seems to come from the attempts of the water committee, made up of the ordinary business men usually found in city councils, to solve a problem which requires financial and engineering ability and experience of a high order. They have failed to recognize the magnitude of the problem, and their lack of the special preparation necessary to attempt its solution; they have neglected the sources of information and assistance which are close at hand; and are in some individual cases offended if the chief of the water department, in the regular discharge of his duties, express his opinion upon the merits of a proposition under discussion.

No satisfactory solution of the problem can be reached until the council admits its inability to cope with so severely technical a subject, and turns the problem over to competent engineering and financial authority. Perhaps the engineering departments of the city are a full load for the men in charge of them. Certainly the problem of pure water for the city is large enough to demand the full time of more than one man for some months. Possibly, therefore, it may not be advisable to add this work to any one or more of the city's force. Some one may be relieved from present duties, however, or some competent outside authority may be selected to direct the investigations and give unity to the work. It is difficult to find one person with both engineering skill and financial acuteness sufficient to treat all sides of the subject in the most complete manner, so that a commission made up of acknowledged authorities on both lines may be desirable. Certainly, whether one man or a commission is intrusted with the work, there should be the fullest liberty to obtain all expert assistance and advice considered necessary. One or two hundred thousand dollars expended by such a commission will save the city many times that amount, besides giving it the satisfaction of knowing that there is nothing better obtainable. But the commission should have full power to get all the advice it wishes, and should be of such eminence that it is not afraid to ask for advice, so that it will not be necessary to go through the double and triple commission programme, so frequently followed by city councils whose pockets or whose friends are not satisfactorily treated by such non-partisan and non-purchasable bodies as the usual engineering commissions prove to be.

New Orleans Sewers. The city of New Orleans has been trying for five years to secure a system of sewers from a private company to which a

franchise was granted in 1892, and is still practically without sewers. The city has proceeded upon the theory that all the natural monopolies of city life, including water, gas, light, sewers, garbage disposal and others should be administered by companies under franchises granted by the city and presumably under the supervision of the city authorities. Actually the city is very poorly served, or at an excessive cost in all instances, and there is a practical failure of any service in the sewer contract. The first contract was let to the New Orleans Sewerage Company, which has thus far done little work, has been sued by the city for annulment of its contract, since it has not constructed the sewers designated therein, and has been placed in the hands of a receiver. A new company, the New Orleans Sewer Company, has been formed and asks that the franchise be considered valid and transferred to it. As an inducement to the city to grant these requests, the company proposed in May to give the city 15 per cent. of the net profits after expenses and interest on cost are paid. Under the original franchise a schedule of charges is provided, and connection with the sewers is made compulsory.

The first proposition of the new company was discussed for two months, and rejected by the city, and was followed, about July 1, by a second proposition, offering the city two per cent. of the gross revenues, which is also rejected. Meanwhile the suit to annul the franchise of the old company is pending. If the suit is decided in favor of the company the city will be in its hands, and it may take its time to complete the system, and the property owners must pay the high annual rates provided for the use of the sewers, being compelled by the ordinance to make connection.

New Orleans is the only city of large size which has given its sewerage service into the hands of a private corporation, and her experience will act strongly as a deterrent upon other cities proposing to try the same plan.

The theory of this solution of the sewerage question is wrong when considered from any possible standpoint. The disposal of street water may be left out of the discussion, since the sewerage system of New Orleans must be built for house sewerage only. The interests of the city at large demand that every house must be connected with the system, especially since there is no other possible method of disposal, except that by cart, which is now in vogue, and is vigorously denounced as an unbearable nuisance. It is necessary to make the expense of maintaining connections as small as possible, and to remove the tax as far from a direct and continuous assessment as possible, to induce general connections, to work as little hardship as possible and to equalize the burdens. The entire system is to be constructed as rapidly as possible. Under the fran-

chise the main portion of the system was to be constructed in five years, and the remainder in five years more, with some impossible exceptions of portions of streets lying beyond fifty feet of unoccupied ground.

If, for any reason, the city is unable to raise the money to pay for the construction of the system, this would appear to be an excellent place to try the proposition suggested in these columns last month. Under this plan, the city would furnish plans and specifications and have complete control of the construction, and the contract for the system would be let to the company that would agree to construct the system for the least money and at the lowest rate of interest upon the cost.

The city should pay this interest from its general funds, and the original cost may be met by assessments and general taxes, as the local conditions may determine. These conditions are so dependent upon the local customs and laws that scarcely any two cities, certainly cities in no two states, can follow the same system. There is no system of assessment which contemplates indefinite annual payments for sewer connections, whether in use or not. The nearest approach to such a system is that in use in paying for the east side main sewer in Rochester, N. Y., described in MUNICIPAL ENGINEERING, on page 179, March, 1897. These assessments run for forty years, but the rate of the assessment is changed every five years, so that changes in condition of the property are taken into account at each five year period, and when the entire cost is paid, in forty years, payments cease. Forty annual assessments, at the rates fixed in the franchise of the New Orleans Sewerage Company, would more than pay principal and interest on the entire cost of the system. If the city pays the interest, as above proposed, and also pays the cost of maintenance, a very much smaller number of assessments would suffice. The necessity of pumping the sewage at the outlet accounts for part of the charge for use of sewers. This expense is properly chargeable to the city at large, and not to the sewer users only.

Detroit Water Rates. Detroit has been cited for the last few years as the city which was doing the best work in the line of working out proper systems of regulation of water waste and of water rates. The state legislature made an attempt to change the system now being inaugurated, whereby the consumer pays for his water by meter measurement, and to substitute therefor free water, the expense of maintaining and extending the system being met by a general tax. Superintendent Case appeared before the legislative committee, and made a very strong statement of some of the unjust discriminations that would be made by such a law, closing with the

statement that the new Majestic office building, which does not pay two per cent. on the investment, would pay as much water tax under the new law as all the breweries in the city together. He also showed the certainty that, with no check upon consumption, the waste would be enormous and the expense of maintenance and extensions many times increased. The city has used no more water the last year than it did ten years ago, and has 75,000 more people. The water rates have also been reduced since 1890, so that there has been a saving to the consumers of nearly $450,000.

The expenditures for improvements have also been quite large. The water board has just inaugurated an additional cut of 25 per cent. in the rates, with a possible extension of the cut at the end of the year. All these things seem to have been made possible by the prevention of waste brought about by a general introduction of meters, coupled with intelligent management of the works and scientific design of the improvements which are constantly under way. A saving of $25,000 is also made for next year by a general cut in salaries of all employes. This may perhaps be justifiable when salaries are being cut in so many lines of work, and profits are reduced, but does not seem to outside observers to be a fair return for the efficiency which the professional employes possess, and the faithful discharge of their duties, which the practical results demonstrate.

Reference is made to page 179, March, 1897, and 240, April, 1897, of MUNICIPAL ENGINEERING, for discussion of some of the conditions in Detroit.

CURRENT INFORMATION.

A RAFT AS A MEANS OF PREVENTING VEGETABLE GROWTH IN WATER.

The growth of vegetable and animal organisms in water reservoirs is one of the most troublesome difficulties in water works management. A simpler and less expensive solution of the problem than covering reservoirs with a roof is hoped for by water works managers. Probably the nearest approach to this is the plan of Mr. Charles Elliot, former superintendent of the Spring Valley Water Works, San Francisco, described some years ago before the American Water Works Association. In compliance with a request for information regarding Mr. Elliot's plan, we quote in full a letter written by him in August, 1890, describing his experiment in constructing a raft to take the place of a roof over a reservoir. We are indebted to Mr. Dow R. Gwinn, of Quincy, Ill., for a copy of this letter, which is as follows:

The first water works of this city was started about the year 1859 and was a private company called the "San Francisco City Water Works." I started to work for it in September, 1860, and Mr. C. W. Boynton was their engineer. They had great trouble with the water, which comes from Lobos creek, a stream which receives its waters filtered from the surrounding sand-banks west of the city. The water in this creek is as clear as crystal and almost as pure as distilled water, and after running through a wooden flume and cement pipe line (some four miles in length), it is pumped into reservoirs.

These reservoirs had division walls in them, and for the first year and a half they had to be kept cleaned, first on one side and then on the other, every ten days. In eleven or twelve days the green growth, known as frog spittle, would clog up the No. 16 brass-wire screens as fast as they could be changed, and the water would get so bad in the pipes that all of the dead ends would have to be blown off twice a week. This continued during the whole year, although our temperature is between 60 degrees and 65 degrees throughout the year.

We constructed a roof over these reservoirs of light posts and rafters and ⅞x6 inch tongued and grooved redwood lumber, sunproof. We examined the water from time to time for twenty years, and during this time we had no occasion to clean these reservoirs.

During this time the posts rotted and part of the roof fell in. We replaced it with a new roof, and while building it we were obliged to clean it out every ten days as before. The second roof has now been on for more than ten years and the water is as clean and as clear as crystal and nearly as pure as distilled. We have got two boilers that were supplied with water from this reservoir for twenty-eight years, and are quite good boilers yet.

Our next experience was with water in a lake about twenty feet in depth. We were troubled with heavy growths of tule and water grass (grass that grows fifteen and twenty feet long from the bottom). We cut the tule out near the roofs with sickles on long poles and have completely killed them, and to get the grass out of the lake we used a long chain of one-quarter-inch links, which we fastened one end of to the shore, and then took the other end out in a boat, giving it a long sweep (chain 800 feet long), then hitched two mules to the end and drew it ashore, dragging all the grass out by the roots. But this did not make the water any better, as it took twelve men constantly shifting screens (covered with No. 16 brass wire-cloth, six deep and twenty in a row, covered with cotton cloth) to keep the water anything like good. We had also to have all the dead ends blown off once or twice a week all over this section this water supplied. I could not build a roof as there was no foundation, so I conceived the idea of building a raft and drawing from the center of it. This raft (400 square feet) is not quite as large as I would wish it, but since it has been built it only takes four men to shift the screens, two days and two nights, and no longer any necessity of blowing off dead ends, and no complaint of bad water.

Since then we have covered another reservoir (from which water is pumped), 200x150 feet, receiving its supply from Almeda creek across the bay.

The grass had commenced to grow in it and clog up all the screens. We put on a roof to keep the sun off and in three or four days the grass all died, floated to the surface and was hauled ashore and carted off.

I think this is the best, least expensive, and only sure way of keeping water good in reservoirs that are shallow, without wind and in hot climates. There is no vegetation in the shade in water, consequently there cannot be any decayed vegetation, and the fish will shelter under the raft and congregate in such numbers that they will eat up all the animalcula before it reaches the outlet, that is if you have the fish, which every well-regulated lake reservoir should have.

In water works business it is pretty hard to make superintendents agree, but if this is tried in any of the eastern water works I would like to have the credit of the suggestion, and would like to make it as a separate communication from your committee.

CHARLES ELLIOT,
City Superintendent S. V. W. Works.

Mr. Gwinn suggests that there is a mistake in the figures as to the size of the raft—that it covered 4,000 square feet, instead of 400, and this seems likely.

If Mr. Elliot's experiment has since been

tried elsewhere it would be interesting to know the results, and information of this kind is cordially invited by Municipal Engineering Magazine.

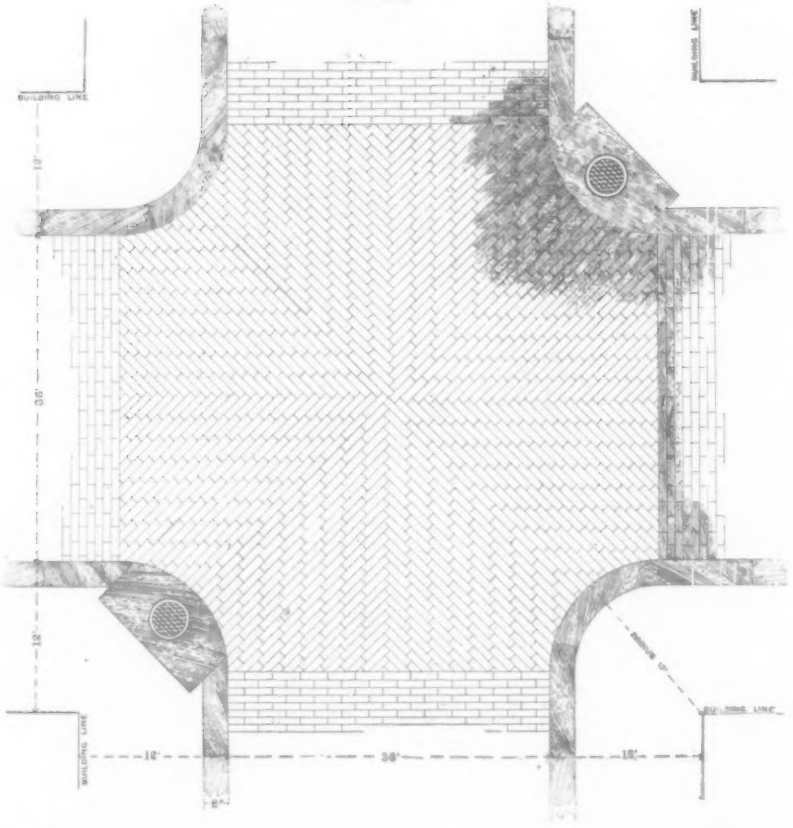
PUBLIC WORK IN ST. LOUIS.

A summary of facts regarding the streets of the city of St. Louis has been set forth by Mr. A. N. Milner, street commissioner, in a brochure strikingly illustrated with photographic views of some of the most attractive St. Louis streets, together with drawings showing methods of work. Mr. Milner's compilation of facts shows that St. Louis now has eleven boulevards. The street railways comprise 33 miles of cable and 265 miles of electric lines, which, for the year 1897, are taxed $4,391,740. The city has a total of 377 miles of improved streets and 98 miles of alleys, the paving materials of which are as follows: Streets—Granite, 47.13 miles; asphalt, 9.03; brick, 5.12; wood, 8.35; telford, 61.64; macadam, 267.80; limestone, .84. Alleys—Granite, 6.91; asphalt, .03; brick, 4.72; limestone block, 85.98; artificial stone flagging, .79.

PLAN OF INTERSECTION

VITRIFIED BRICK STREET

80' WIDE.



The block patrol system of street cleaning embraces six miles. The work is done by a force of two foremen at $2.50 per day each, 43 patrolmen at $1.50 and eight carts at $2.50, making a total of $89.50 per day or $14.71 per mile per day.

The cost of street repairs and maintenance per 100 square feet is given as follows: Granite—Cost, $3.25; maintenance, 14 cents. Wood—Cost, $6.35; maintenance, 94 cents. Asphalt—Cost, by contract, $12.50, and by city repair force, $8.05; maintenance, $1.04. The total square feet of asphalt maintained by the city is 757,909, and 98,756 was repaired. It is estimated that the city saved $4,454.64 by making its own repairs.

The total disbursements for street cleaning during the last fiscal year amounted to $516,542. Seventy miles were cleaned by contract with sweeping machines at an expenditure of $71,323.15, making the cost per mile per annum $1,012.23, a reduction, as

compared with the previous year, of $54.08 per mile.

The report is also accompanied by specifications for street signs, artificial stone flagging, granite, brick and rock asphaltum pavements.

SPECIFICATIONS FOR GRANITOID SIDEWALKS.

The following are the specifications now in use in St. Louis for the construction of granitoid sidewalks:

Cement—All cement shall be fine ground. Eighty-five per cent. shall pass through a sieve having ten thousand meshes to the square inch.

All cement shall be capable of withstanding a tensile strain of five hundred (500) pounds per square inch of section, when mixed neat, made into briquettes and exposed twenty-four hours in air and six days under water.

All cement shall be capable of withstanding a tensile strain of two hundred (200) pounds per square inch of section, when mixed in the proportion of three parts sand to one part cement, and exposed twenty-four hours in air and twenty-eight days under water.

All cement shall be put in well-made barrels, and all short weight or damaged barrels will be rejected.

Cement without manufacturer's brand and certificate will be rejected without test.

All cement will be subjected to tests for soundness or permanence of volume. All cement for use on the works shall be kept under cover, thoroughly protected from moisture, raised from the ground, by blocking or otherwise, and dry until used. The contractor shall keep in storage a quantity of accepted cement sufficient to insure the uninterrupted progress of the work.

All cement furnished will be subjected to tests of such character as the street commissioner shall determine, and any cement which, in the opinion of the street commissioner, is unsuitable for the work herein specified, will be rejected.

Metal Parting Strips—The contractor will be required to use metal parting strips, four inches deep, one-fourth of an inch wide and of such length as may be directed by the street commissioner.

Coloring—The wearing surface of the sidewalk pavement, when required, shall be mixed with such color or colors as the street commissioner may direct.

Preparing the Bed for the Sidewalk Pavement—The sidewalks shall be excavated and shaped to the proper depth and grade as directed by the street commissioner, and all the refuse material shall belong to the contractor and shall be promptly removed from the line of work.

Ordinary Single Flagging—After the shaping is done, a foundation of cinders not less than eight (8) inches thick shall be placed upon the sub-grade, which shall be well consolidated by ramming to an even surface, and which shall be moistened just before the concrete is placed thereon.

After the sub-foundation has been finished the artificial stone flagging shall be laid in a good workmanlike manner.

The same to consist of two parts: First—A bottom course, to be three and one-half (3½) inches in depth. Second—A finishing of wearing stone, to be one-half (½) inch in depth.

The bottom course shall be composed of crushed granite and Portland cement, which shall be mixed in the proportion of one part of cement and three parts of crushed granite.

The crushed granite shall consist of irregular, sharp-edged pieces, so broken that each piece will pass through a three-fourths (¾) of an inch ring in all its diameters, and which shall be entirely free from dust or dirt.

The crushed granite and the cement in the above named proportions shall first be mixed dry, then sufficient clean water shall be slowly added by sprinkling while the material is constantly and carefully stirred and worked up, and stirring and mixing shall be continued until the whole is thoroughly mixed.

This mass shall be spread upon the sub-foundation and shall be rammed until all the interstices are thoroughly filled with cement.

Particular care must be taken that the bottom course is well rammed and consolidated along the outer edges.

After the bottom course is completed, the finishing or wearing course shall be added. This course to consist of a stiff mortar, composed of equal parts of Portland cement and sharp screenings of the crushed granite, free from loamy or earthy substances, and to be laid to a depth of one-half of an inch and to be carefully smoothed to an even surface, which, after first setting takes place, must not be disturbed by additional rubbing.

When the pavement is completed, it must be covered for three days and kept moist by sprinkling.

COMPARATIVE TESTS OF ASPHALT IN LOUISVILLE.

In complying with a request from C. C. Mengel, president of the Board of Trade, Louisville, Ky., to have Third street, in front of the Board of Trade building, paved, Mayor Todd decided to accept a proposition by the Barber Asphalt Paving company and the Breckenridge Asphalt company to pave samples of streets free of charge, for a comparative test. Mayor Todd addressed a communication to each company, July 9, explaining the situation and asking the companies to lay sample strips of their pavement, side by side, for a distance of 300 feet. The companies consented, and the work will probably begin very soon.

WOOD BLOCK PAVEMENTS IN SAN FRANCISCO.

The street committee of the Board of Supervisors, San Francisco, Cal., in reporting adversely upon the proposed repaving of a street with wooden blocks, said: "The experience of the city in wooden pavements, although of a somewhat different construction, has been such as to justify the position

now assumed by the committee, that until more evidence of the durability of this wooden pavement is shown, it is the opinion of the committee that to lay it without a better knowledge than at present possessed would, as heretofore, be a costly experience and not justifiable under the circumstances." In commenting on this report the San Francisco Post of July 10, says: "The case could not be more mildly stated than this. The fact is, wooden blocks have been the most disastrous failure for street paving purposes in this city imaginable."

SUGGESTIONS REGARDING STREET SPRINKLING.

The executive committee of the Rochester association of the L. A. W. submitted to the executive board of Rochester, N. Y., July 12, some suggestions regarding street sprinkling, with the request that the board order its employes of the street department to act in accordance therewith, which were as follows:

"Streets must not be sprinkled on damp days, or any other days when there is no wind or dust.

"Under no circumstances shall men sprinkle the crosswalks.

"Streets must not be sprinkled within four or five feet of the curb lines on either side of the street, so as to leave a foot or more of dry street outside of the cobbled gutters for the use of wheelmen and wheelwomen.

"If streets be sprinkled and resprinkled until they are actually muddy and are kept so, it will be regarded as evidence of incompetency on the part of the driver, and he will be discharged.

"Streets neglected entirely will be regarded as cause for the dismissal of the sprinklers in that section of the city.

"Streets are to be merely sprinkled—not soused. If possible, the sprinkling attachments to the carts shall be adjusted so that too much water may not run through them.

"Sprinklers must shut off the water when passing carriages, pedestrians, etc., so as not to wet or spatter them. This rule will apply to meeting people crossing streets on the crosswalks and carriages standing in front of buildings."

DEFECTIVE PAVEMENT FOUNDATIONS.

In a communication filed with the board of public works, at Columbus, O., July 12, John Murphy & Co., manufacturers and sellers of Murphy's grout filler for brick pavements, took exceptions to a recent opinion by Director of Law Owen, in which the use of grout filling was judged to have been a defect in the plans under which certain streets of the city were improved. The communication says that an examination of the streets referred to will show that the foundation and not the filler is the cause of their present condition; that it is a well-known fact to contractors and others connected with the improvement of streets, that if the foundations of over half the paved streets were examined they will be found to have four inches of broken stone, instead of eight, as specified, and four inches of sand instead of two inches.

THE ST. LOUIS WATER FILTRATION BILL.

Water Commissioner Holman of St. Louis, Mo., is of the opinion that the Sweeney filter bill, if passed, will render the city liable to lose its water works. The bill, which in its present shape is claimed to be illegal, reads:

"The assembly shall have no power, directly, to contract for any public work or improvement * * * nor to fix the price or rate therefor, but the board of public improvements shall * * * prepare and submit to the assembly estimates of costs of any proposed work, and under the direction of the ordinance shall advertise for bids, as provided for purchases by the commissioner of supplies, and let out said work by contract to the lowest responsible bidder, subject to the approval of the council. Any other mode of letting out work shall be held as illegal and void."

Commissioner Holman says that under the ordinance the comptroller, who is the fiscal officer of the city and who, before any contract can be let must certify that there is money in the treasury to pay for it, and the board of public improvements, on whose estimate the comptroller's certification is based, are both left out entirely, but the mayor, health commissioner and water commissioner are required to enter into a contract within ten days after the passage of the ordinance for filtering the water from Sept. 1, 1898, to Sept. 1, 1918, by the Jewell filter and electric process. The contract is not to be let to the lowest bidder.

PROPOSED TO ATTEMPT BOODLING.

In a suit of Chas. H. Atkins of Milwaukee, Wis., against the Filer & Stowell Mfg. Co., pump manufacturers of that city, evidence has been brought out to the effect that the Filer & Stowell company empowered Atkins to use money to influence certain Chicago aldermen in 1894 to award to that firm the contract for building pumps for the city of Chicago. Aldermen who were serving in Chicago at that date indignantly deny the charge.

LICENSES AND BONDS REQUIRED OF SIDEWALK CONTRACTORS.

Owing to the numerous complaints of the manner in which sidewalk contractors have been violating their contracts the board of public works at Kansas City, Mo., passed a resolution recently asking the council to enact a measure requiring each

sidewalk contractor to furnish a bond of $5,000 and placing the license for such contractors at $200 a year. It was discovered recently that a number of granitoid sidewalks were not built according to specifications and that in two instances contracts had been violated.

THE AVERILL-BARBER CASE.

The case of William W. Averill against Amzi L. Barber and others was argued July 9 before Justice Davy at Rochester, N. Y., in special term. This action was commenced in January, 1893, and is based on business relations between Averill, Barber and E. Burgess Warren in 1879.

DROPPING OF ASPHALT ON STREETS.

While a teamster employed by the Barber Asphalt Paving company, New York City, was taking a wagon load of hot asphalt over Jersey street, July 2, some of it leaked out on the pavement. The teamster was arrested and taken before Judge Braunlein, who decided that he was not guilty of a violation of the law under the meaning of Section 17, subdivision 2, of the city ordinances. Section 18, subdivision 1, of the ordinances says that it is a violation of the law to drop dirt, garbage, ashes or refuse on the streets, but Frank R. Perkins, attorney for the Barber company, declared that asphalt could not come under any of these heads, as it was customary to chew asphalt in order to ascertain its quality. Judge Braunlein decided with him and dismissed the case. In the case of two other teamsters, who were arrested because finely crushed stone was leaking from their wagons, each was fined.

INVESTIGATION OF PAVING AT ST. LOUIS.

Commissioners Holman and Ridgeley, who composed the special committee appointed at St. Louis, Mo., to investigate the paving of Delmar-ave., which was complained of by a resident of that thoroughfare, reported that "the concrete was found soft in six of the eight holes dug in the street; that the curbing is not set as required by contract; that sufficient concrete was not put under the curb to give it a firm support; that the roller used is not of the requisite weight; that the soft place designated in front of 4905 Delmar boulevard was covered with concrete, but that the material under the concrete was firm; that the concrete is not of the quality specified." Interested property-owners on Garfield avenue, between Taylor and Cora avenues, have declared the paving on that street faulty, and the guttering not constructed in accordance with the specifications.

EXPERIMENTS WITH BRICK PAVING AT NEWARK, N. J.

The theory advanced by Superintendent Mundy, of the board of works, Newark, N. J., at the time the brick pavement was constructed on South Tenth street, near Ninth avenue, has proven correct. He contended that heat would cause the bricks to expand, and that the cross walk made with the brick at Ninth avenue would be raised by this expansion, and the vacant space underneath the walk would increase the noise. The work has raised some three inches and the noise in the neighborhood is a nuisance. To obviate the rumbling caused by the passage of vehicles over the brick pavement Mr. Mundy will experiment with doing away with the cross walk and relaying the brick on the same curve as the remainder of the pavement. Tar will be substituted for cement on the ground that it will give in case the heat causes the brick to expand.

INVALID LEGISLATION PROVIDING FOR BRIDGE BUILDING.

The Supreme Court of Michigan declared unconstitutional July 16 an act of the last legislature, which provided for the construction of a bridge across the Grand river in Ada township, Kent county. The law provided that the township should contribute $4,000, two other townships $500 each, and the county $5,000, and these sums should be raised by taxation, one-half in 1897 and the other half in 1898. The court says that it needs no argument to show that the act is destructive of local self-government; that it leaves no discretion to the taxpayers or their officers; that it is direct violation of the constitution in that it deprives the electors of the right to determine by vote the improvements they desire, and the taxes they are willing to subject themselves to on account thereof. The contract for the bridge had been awarded to the Wrought Iron Bridge Company, of Canton, O.

DAILY REPORTS OF PUBLIC WORK.

A new system for the supervision of all the heads of departments and employes under the control of the board of public works has been inaugurated at Des Moines, Ia. C. D. Boardman and G. C. Sims, who comprise the board of public works, have formulated a plan by which a system of daily reports are made to the board by the superintendents, commissioners and others, showing where the men under the latter were last at work, the character of the work, the number of men and teams employed, and the probable length of time it will require to complete the jobs under way.

The reports are filed with the board every morning and are examined during the day. The new plan enables the board to keep accurate pay-rolls and to add or reduce the force of men employed on any piece of work. The members also personally visit the points where grading, paving, sewering or curbing is in progress two or three times each week, thus keeping the work well in hand, and being familiar with the progress made from day to day.

TO INVESTIGATE SEWAGE DISPOSAL.

A bill was passed by the Connecticut legislature June 10 which provided that the Governor be empowered to appoint five suitable persons as a commission, who shall serve without pay, and shall investigate the question of sewage disposal of the cities, boroughs and towns of Connecticut. The commission shall have power to summon witnesses before it, with books, papers and maps, and at the conclusion of its investigation shall formulate a report and submit the same to the next General Assembly. Any town, city or borough may consult said commission and obtain its advice concerning sewage disposal, methods of sewage disposal and operations relating thereto, and shall pay to said commission all expenses incurred by it in any service rendered to each town, city or borough.

INFORMALITIES IN BIDDING ON CONTRACTS.

The question as to whether the board of public works at Buffalo, N. Y., was justified in declaring the bid of the Utica Paving company as informal or not was referred to Corporation Counsel Feldman, who gave his opinion July 19 as follows:

"Upon inquiry I learn from the board of public works that the only ground upon which the bid of the Utica Paving company is declared to be informal is that no plans, specifications and quantities are on file with the board for the particular kind of pavement proposed to be laid by this company. There is no contention, therefore, that the company is not responsible, that it is unable to properly perform the work, and that it has not the facilities or the requisite ability to successfully carry on and finish the work it proposes to undertake. Assuming the foregoing to be a correct statement of the facts, I am of the opinion that the board of public works is not justified in refusing to accept proposals from paving companies situated similarly with the one in question."

INQUIRIES REGARDING PAVEMENTS.

The board of public works of Detroit, Mich., addressed letters to the boards of public works in all the cities of the world, asking their opinion regarding the various kinds of pavements, their durability, sanitary condition, cost, etc. Replies have been received from a number of cities. The board of public works of Buffalo recommends asphalt. It is believed by the board to be the best and healthiest pavement they have. The average cost is $2.50 per yard. Denver, Col., prefers Trinidad Lake asphalt and say that in the end they consider it the most satisfactory pavement, taking all things into consideration. In Cincinnati the board seems to have no preference between vitrified brick, block and asphalt. There the brick costs $1.60 per yard and the asphalt $2.40. In New Orleans both brick and asphalt cost when laid about $4.50 per yard. They express no choice there, but consider brick and asphalt excellent pavements. In St. Paul the board says that asphalt is the best of any on any kind of a street and under almost any circumstances. In New York asphalt is considered the best pavement and an excellent quality is laid for about $3 per yard. In nearly all of these places cedar is not used to any extent and it is said is fast going out of use.

A TRINIDAD DINNER.

A number of gentlemen interested in investments on the Island of Trinidad who were in London at the time of the queen's jubilee celebration were entertained at dinner at the Trocadero restaurant by the Trinidad Asphalt company. Mr. W. K. Marriott acted as toastmaster. Mr. E. Previte proposed "The Army and Navy," to which Maj. Rooks, commanding officer of the Trinidad detachment, replied. Mr. H. F. Previte, barrister-at-law, proposed "Prosperity to Trinidad." Capt. Rust, Trinidad artillery, replying. "The Asphalt Industry" was proposed by Mr. Nanco, solicitor, port of Spain, Trinidad, and Mr. A. L. Barber, president of the Trinidad Asphalt company, in replying gave same interesting details of the progress of the industry. There were also present Mr. Harding-Finlayson and Mr. J. W. McCarthy, both of Trinidad; Capt. Lack, Trinidad cavalry, with Troopers de Boissiere, Wilson and Sanderson. Lieut. Lazare, Trinidad artillery; Mr. J. W. Previte, Mr. H. H. Wyatt and others.

CORRECTIONS.

To the Editor of Municipal Engineering:

Please make the following corrections in paper on "Sewage Disposal Plant at Altoona" in Municipal Engineering for July: Page 11, foot note, read March 20 instead of May 25; page 13, twenty-fourth line from top, read 44 inches instead of 94 inches.

HARVEY LINTON.

Altoona, Pa., July 2.

NEW PUBLICATIONS.

Biennial Report of State Engineer of Wyoming, by Elwood Mead, State Engineer.

Mr. Mead's report is a very thorough review of the resources and topography of Wyoming and deals with engineering questions pertaining to its water supply, irrigation, etc. The report is of more than technical interest. It is written with the evident purpose of interesting any one into whose hands it may fall, whether directly concerned or not, and in this it is more likely to succeed than the usual official document of its kind. A number of halftone engravings of Wyoming views add to the attractiveness of the report.

Twelfth Annual Report of the Illinois Society of Engineers and Surveyors. Price, 50 Cents.

This report contains several valuable contributions, abstracts of some of which have heretofore appeared in this magazine. Among the notable features are the report of the committeee on water works and water supply, and on municipal engineering. Some of these papers are the following: "Test of High Duty Pumping Plant Under Ordinary Working Conditions," by Dabney H. Maury, Jr.; "The Sedimentation Process in Sewage Disposal," Prof. A. N. Talbot; "A Country Road Paved With Brick," J. E. Miller; "A Concrete Arch," Chas. H. Nicolet.

"The Technic." Annual Publication of the Engineering Society of the University of Michigan. Price 50 Cents.

Among the contributions in this number are: "Electrical Plants for Small Towns," Alex. Dow; "Notes on Water Consumption," C. E. Greene; "The Construction of Pipe Sewers," H. E. Riggs; "Good Roads," D. B. Luten.

A Concrete Arch, by C. H. Nicolet of La Salle, Ill.

In this paper, presented at the annal meeting of the Illinois Society of Engineers and Surveyors, and republished in pamphlet form, Mr. Nicolet describes his construction of a concrete arch over Big Vermillion canon at a height above water of about eighty feet, where the walls are thirty feet apart, but required a span of a little over forty feet. The rise was eight feet; width, sixteen feet; thickness of ring at crown, twenty-six inches; at spring, thirty-two inches; wings, seven feet long; spandrel walls and wing walls, sixteen inches inside coping, vertical on outer face and battered three inches per foot on inner faces; coping, twenty-two inches wide and six inches thick, extending out on each side of walls three inches. The paper describes how the work was done and the materials used and says that an inspection after two years shows no cracks or faults whatever.

Seepage or Return Waters from Irrigation. Bulletin No. 33 of the State Agricultural College of Colorado.

The Smoke Nuisance and Its Regulation, with Special Reference to the Condition Prevailing in Philadelphia. Discussion at the Stated Meeting of the Franklin Institute.

PERSONAL.

E. G. Barrow has been re-elected city engineer at Hamilton, O.

H. S. Graham has been appointed superintendent of water works at Delhi, N. Y.

Walter F. Cleveland has been reappointed sewer commissioner of Brockton, Mass.

Daniel S. Hosbrook has been appointed village engineer at Mill Creek Valley, O.

E. J. Bates has been appointed superintendent of the water works at Homer, N. Y.

William A. Fulton has been appointed superintendent of water works at Nyack, N. Y.

J. W. Peck has resigned his position as superintendent of water works at Evansville, Ind.

Henry McTague has been appointed commissioner of public works at Mt. Vernon, N. Y.

William S. Beecher has been appointed Director of Public Works at New Haven, Conn.

William Meyers has been elected superintendent of sewer construction at Huntsville, Ala.

The Hon. W. L. Douglas, Brockton, Mass., has resigned his position as sewerage commissioner.

Philip W. Boyd has been elected superintendent of water and streets at Winchester, Va.

William H. Ashwell, C. E., has been elected superintendent by the park board at Detroit, Mich.

Alfred S. Betts has been appointed a member of the Board of Water Commissioners at Wilmington, Del.

Thomas Leavitt has been appointed a member of the Board of Public Works at Salt Lake City, Utah.

S. L. Earle has been appointed superintendent of streets, to succeed Richard Oldham, at Jacksonville, Fla.

John P. Hatterchide, who was recently appointed chief engineer of the water works at Newport, Ky., has resigned.

J. L. Ludlow has been engaged as supervising engineer for the construction of the sewerage system at Huntsville, Ala.

Daniel W. Brown, ex-auditor, has been elected secretary of the water works at Cincinnati, O., to succeed John Whetstone.

Henry M. Stow, the inventor of the wooden block pavement, which is commonly used in Chicago, Ill., died in that city July 9.

Henry A. Robinson, general manager of the National Sewer Pipe company of Akron and Barberton, O., has resigned that position to become general manager of the Mexican City Manufacturing company in the City of Mexico.

John M. Goodell, Assoc. M. Am. Soc. C. E., has resigned his position as assistant secretary of the American Society of Civil Engineers.

C. H. Rust, assistant city engineer of Toronto, Ont., has been appointed a member of the Canadian society of civil engineers.

D. W. French has been appointed superintendent of the Hackensack water company, Hoboken, N. J., to succeed the late Charles B. Brush.

William T. Porter has been elected superintendent of the board of water commissioners at Wilmington, Del., with Joseph A. Bond as chief engineer.

H. D. Ellis, M. Am. Soc. of C. E., formerly roadway engineer of Toronto, Ont., has been appointed commissioner of public works and surveys to the Rajah of Sarawak, Borneo.

John Ericcson has been appointed city engineer at Chicago, Ill., to succeed Lewis B. Jackson. Frank E. Davidson has been appointed superintendent of sewers to succeed G. L. Clausen.

Prof. E. G. Smith of Beloit college, Beloit, Wis., has gone to Europe for the purpose of investigating the systems of water filtration in vogue in the European cities.

H. C. Lange has been elected president of the board of water commissioners; R. H. Peek, superintendent; George B. Dermody, secretary, and W. H. Reynolds, chief engineer, at Galveston, Tex.

George C. Marsh, formerly manager of the road machinery department of the Aultman company, Canton, O., has been appointed manager of the jaw crusher department of the Gates Iron Works, Chicago, Ill.

The Washington supreme court has reversed the decision of the superior court to the effect that Edward S. Orr was the legally elected mayor and has declared A. V. Fawcett mayor of Tacoma, Wash.

F. M. Vail, superintendent of the Alcatraz Asphalt company, sails for Europe Aug. 1. He will construct pavements in Paris, Hamburg, Glasgow, Edinburg and London. The work, which is largely experimental, will be done by a company which has been formed in Great Britain.

MACHINERY AND TRADE.

A NEW HAND STREET CLEANER.

A hand street cleaner is being tried for day work on the streets of Indianapolis. This machine is the invention of Mr. R. W. Furnas, who is also the inventor of the Furnas Pneumatic Street Cleaner. The machine is a development of the street scraper idea, and is simply a steel scraper mounted on wheels and having a brush which periodically removes the dropping from the scraper, backward and upward, into a box, which is hung between the wheels and to the rear of the scraper. The box is large enough to hold the accumulations for an average hour's work.

The objects desired to be obtained by the use of the machine as compared with the regular street scraper are three, namely:

1. No piles are left along the curb, as the machine can be unloaded directly to wagon, or at an unfrequented place.

2. Where the street does not need scraping, the operator, by depressing the handle, raises the scraper from the street. This is very important, as the ordinary street scraper, after gathering the load, leaves a trail of dirt as it is pushed to the point of unloading.

3. The sweeping from a considerable district can be unloaded at one central point without inconvenience or delay to the operator. This will probably enable one team to do the work of three as compared with the present method.

Mr. Furnas, with his usual conservatism, says it is yet too early to give an intelligent opinion as to the merits of the machine.

LATEST IMPROVEMENTS IN RAILWAY ASPHALT PLANTS.

Since its introduction to the readers of Municipal Engineering, in the December number, the Hetherington railway asphalt plant has been considerably modified and improved. The last plant built has laid about 26,000 yards of pavement very successfully. Since the building of this there have been still further improvements brought out which are embodied in a plant which the manufacturers are just completing in their yards. The latest improvement added to this plant is a platform elevator attached to the melting car, by means of which all of the materials are elevated from the ground to the platform about the tops of the kettles. Another marked improvement in the plant lies in the special furnace construction; this is such that the melting down of asphalt is accomplished very rapidly. The normal capacity of the kettles, once filled, is sufficient for 1,800 yards of two-inch topping at one melting; as a matter of fact, however, the asphalt melting capacity is now unlimited, as, by reason of the special melting arrangements, it is possible to refill and melt down one kettle full of asphalt before the contents of the other two are used.

Remarkable results have been attained, in the direction of sand heating, by the sand dryers with which the plant is fitted. It has been demonstrated in actual service that sand in sufficient quantity for 1,800 square yards of two-inch topping is turned out easily by the sand dryer. As at present constructed the plant is as efficient as any stationary plant and works both binder and topping with equal facility.

The plant is offered to the market in three different styles; one style embodies two melting kettles and one mechanical agitator, for those who believe that mechanical agitation is the correct method of mixing asphalt. Another style has three large open-topped kettles, of the type in common use in most stationary plants, and no mechanical agitation. The third style has closed-topped kettles of an especial design and a system of hot air agitation that is very efficient. The special steel cars that have been designed and especially built for carrying these plants have proven to be an entire success and the plant has been sent hundreds of miles over the road without, it is claimed, in any manner impairing the alignment of the cars or the machinery thereon. The railway plant will undoubtedly take a very important place in the asphalt paving industry, as it is not only well adapted for working upon large city contracts, but opens up a new field, of very large extent, in the paving of the streets of all of the smaller towns of the country. Over 6,000 yards of pavement have been recently laid in the town of Middletown, O., with one of these plants, and about 21,000 yards in Lima, O.; the pavement being of first-class quality and appearance.

WHAT A HORSE ROLLER MANUFACTURER CLAIMS.

To the Editor of Municipal Engineering:

Having noticed in your question department for July, your comments under the head "Steam Rollers versus Horse Rollers," we feel impelled to write you a few lines upon the subject. We are not in possession, at the present time, of the article referred to on page No. 194, volume No. 10, of Municipal Engineering, but presume from the date when that article must have been written, the writer could not have been aware of the many advantages of the Austin reversible road rollers over other makes of horse rollers, and therefore the comparison that was made must have been made with an inferior and impracticable roller, rather than with a roller which not only can, but does meet every requirement of road construction at a cost less than that of any steam roller made and with better work than any steam roller was ever able to do. These are, perhaps, broad statements, but we trust you will pardon us in the following remarks when we shall attempt to lay before you certain facts about which there can be no dispute, which go to prove the truth of them.

The object for which a road roller is built and intended to be used is to roll down and compact road material, and the roller which will do this the best is the cheapest, but when you can combine in a roller which does this the best, the roller which is the cheapest to operate and maintain, then, of course, you have, par excellence, the best roller.

The Austin rollers of seven, eight and nine tons in weight have a diameter of seventy-two inches and a width of face of sixty inches, with a pressure upon each inch of its face of 333 1-3 pounds of our ten-ton rollers, which is the same pressure per inch as is exerted by the 20-inch face driving wheels of a ten-ton steam roller, and it is not, therefore, necessary for us to go into any long discussion to prove to you, as practical engineers, that the 60-inch face will do better work than two 20-inch faces having the same pressure.

As a matter of comparison, we would desire to state that different makes of steam rollers have different diameters and widths of face, and we desire to call your attention to the dimensions of the rollers made by the three leading manufacturers of steam rollers used in this country. Their dimensions of main driving wheels are 66, 69 and 76 inches in diameter, respectively, while their width of face is 16½ and 20 inches, this latter width being two inches more this year than ever before. These dimensions refer to the large rear, or driving wheels of these steam rollers, while the front roller is approximately on them all 48 inches in diameter and has a width of from 40 to 52 inches, and the maximum weight upon even a 37,000-pound roller will not exert a downward pressure of over 286½ pounds per inch upon the front roller, which is not what does the work, but the rear, narrow tired wheels.

Now, as the diameters, face and pressures of the Austin rollers are seen to be in excess of the average of the steam rollers, they must do better work and the question then comes as to the cost of operation, and we maintain, without fear of contradiction, that four horses and a driver working on an Austin roller only when it is in use and doing other work when the roller is not in use, will cost any municipality less money than will the fuel, water, oil and engineer

upon any steam roller ever made. Again, when the Austin roller is not in operation, it does not require to be slushed to prevent rust, it does not require to be frequently cleaned, tightened, inspected, etc., and, in fact, there is practically no repairs or expense of maintainance about it, whereas there has been no steam roller ever made which does not, some time during its life, require expensive repairs, this, of course, largely depending upon the skill of the engineer in charge.

We have before us the reports from several different municipalities throughout the country that have steam rollers, and in none of them have we failed to find a charge varying from $30 to $236 for repairs on their steam rollers during the past year.

AUSTIN & WESTERN CO., Ltd.

Chicago, July 2, 1897.

TRADE NOTES.

The purchase of a stone crusher is contemplated at East Berlin, Conn.

The Diamond Portland Cement works will be rebuilt on the old site, at Middle Branch, O.

The Buckeye Portland Cement Co. of Bellefontaine, O., is reported as producing 200 bbls. of cement a day.

The Philadelphia and Reading stone crusher at Klapperthal, near Reading, Pa., was totally destroyed by fire July 10.

An appropriation of $25,000 has been recommended at Providence, R. I., for the establishment of a municipal asphalt plant.

The Bermudez Asphalt company's temporary store house at Jackson street and Michigan avenue, Chicago, was burned July 15.

The Scherzer Rolling Lift Co., Chicago, Ill., has been incorporated by Albert H. Scherzer, Haskel C. Davis and Stephen D. Mapp.

The Iron City Cement Co., Allegheny, Pa., has been incorporated to manufacture and sell cement, clay pipe, etc. A. H. Lauman, treasurer.

The O. S. Kelly Co., Springfield, O., secured the contract for furnishing the city of Fon du Lac, Wis., with a steam road roller for $3,250.

Articles of incorporation have been filed for the F. O. Blake Paving company by Frank O. Blake, Allen B. Seaman and Jas. A. Small at Denver, Col.

The Indiana Road Machine company at Ft. Wayne, Ind., will manufacture a new stone crusher, which has been invented by E. L. Lathrop of that city.

A local company has been organized at San Francisco, Cal., to manufacture and introduce on the Pacific coast expanded metal for use in the construction of pavements.

The Salinas Paving & Contracting Co., Salinas, Cal., has been incorporated by Geo. F. Eade, Joseph Eade, Jr., Sherman T. Eade, Mattie J. Eade and Elma S. Eade.

The Alcatraz Asphalt Paving company, Los Angeles, Cal., has been incorporated by J. A. Fairchild, E. W. Gilmore, G. G. Johnson, George R. Wilton and Charles H. McFarland.

The B. M. and J. F. Shanley company filed articles of incorporation June 28 at Trenton, N. J. The principal office will be in Jersey City, with other offices in Newark and Philadelphia.

Sealed proposals will be received at Boston, Mass., until Aug. 9, for cement, sand, and stone for battery at Long Island Head, Mass. S. M. Mansfield, lieutenant-colonel engineers.

The Philadelphia Bridge works, located at Pottstown, Pa., were sold July 15 to C. R. Baird & Co., for $55,000. Work will be resumed as soon as the condition of business warrants it.

The Columbia Construction Co., Portland, Ore., has been incorporated to build railways, wharves, bridges, boats, water works, etc., by Joseph Paquet, D. P. Thomson and W. F. Burrell.

Sealed proposals will be received until Aug. 5 at Mobile, Ala., for furnishing hydraulic cement at McGrew's Shoal Landing, Tombigbee River, Ala. Wm. T. Rossell, Major Engrs.

The Clinton Paving and Building Brick company, Clinton, Ind., secured contracts recently for 400,000 paving brick at Indianapolis, Ind., and brick for 6,000 square yards of paving at Arcola, Ill.

The Blackmer & Post Pipe company, St. Louis, Mo., has shipped forty car loads of sewer pipe to Chihuahua, Mex., to be used in the construction of a sewerage system. About 2,000 feet of 36-inch pipe has been shipped to Albany, N. Y.

The New Jersey Mexican Asphalt company, Jersey City, N. J., has been incorporated to manufacture asphalt and construct street pavements, by James Filton, Union, N. J.; Thomas Cavanaugh, Hoboken, N. J.; Howard C. Griffiths, Jersey City.

It is believed that it will take a hundred years to mine, manufacture and refine the single deposit of asphalt that has been opened at Sisquoc, in Northern Santa Barbara county, Cal., and that the country about is underlaid with equally valuable deposits.

Machinery will be put in to develop a deposit of cement rock which has been located within a short distance of Havre, Mont., on the Great Northern railway. Tests have been made which indicate that the deposit will produce a good quality of natural cement.

Henry L. Schillinger, temporary receiver of the Schillinger Fire-Proof Cement & Asphalt Co., 413 E. Ninety-first street, New York City, has been made permanent receiver by Judge Lawrence of the supreme court, in the suit brought to dissolve the corporation by Phillipina Schillinger.

A pipe cutting machine has been invented by G. O. Morse, city engineer, and E. D. Rich, clerk of the water department at Maquoketa, Ia. It consists of six pieces, or three sections, which can in ten minutes be adjusted to any pipe in a ditch with two men to operate it. It has, with one man to operate it, cut an eight-inch pipe in twelve minutes.

The New York & Ottawa Co., of East Orange, N. J., filed articles of incorporation July 6. The company will build and repair railroads, water, gas and electric works, tunnels, bridges, viaducts, etc. The incorporators are Howard P. Wood and John E. Walker, East Orange; Alfred Luttman, Newark.

Officers and directors have been elected by the Niagara Falls International Bridge company, Albion, N. Y., as follows: George L. Burrows, Saginaw, president; Ezra T. Coann, Albion, vice-president; Lorenzo Burrows, Albion, secretary and treasurer; Edwin O. Sage, Rochester; Albert C. Burrows, Albion; Charles C. Morse, Rochester, and Ezra Rust.

The Alcatraz Construction company filed articles of incorporation July 9 for the laying and construction of pavements, sidewalks and sewers in the United States and Canada. The principal office will be in New York City. The board of directors consists of Charles I. Williams and M. M. Van Auken of Utica and Harry McGillig and Frank L. Meyers.

F. J. Jenner, 26 Cortlandt street, New York City, has the contract for paving with cork-asphalt paving bricks the main entrance and driveway of the Astoria hotel, southwest corner of Fifth avenue and Thirty-fourth street, which is now nearing completion; also to pave Astor court, which will run at the rear of the new Astoria and the Waldorf hotels, from Thirty-fourth to Thirty-third streets. The considerations which decided the architect, lessee and proprietor of the hotel to put cork-asphalt paving bricks were that the elasticity of the material would diminish the noise and vibration caused by the vehicular traffic in the main entrance and driveway, which will be right underneath the main structure to a glass covered court in the center of the hotel. In Astor court will be the entrance for all the provisions and supplies of every kind causing heavy and continuous traffic.

SELECTIONS FROM THE PRESS.

MUNICIPAL AFFAIRS IN AMERICA.

Every city in this country receives sufficient taxes to advance each and every one of them out of the semi-civilized customs with which they are now oppressed. The reason why public comforts and public order are not equal to the home administration is simply because the city governments of the vast majority of cities are turned over to ward politicians and professional politicians, and the contracts for city improvements are made more for the purpose of lining the pockets of the contractors and officials with shekels than for good and economical government. The citizens of European cities would not suffer the oppression and lack of improvements in streets and the disturbance of the quiet of residence sections for a single day, nor would European city officials be permitted to so loosely administer municipal affairs as is so common in American cities. The fact is, that while we are the freest people on earth we are the easiest imposed upon in this respect and suffer unnecessarily because we do not demand better government and improvements commensurate with private comforts and something adequate to compensation for the amount of taxes paid into city treasuries.—Austin (Tex.) Statesman.

COBBLESTONES IN BALTIMORE.

The cobblestoned streets of Baltimore have long been an eyesore to those of its citizens who have had the opportunity to compare them with the modern pavements of other cities. Those who ride wheels or drive teams realize more forcibly, perhaps, than those who are restricted to pedestrianism and the trolley cars how far Baltimore is behind other cities, not only in the character of its street pavements, but in the intelligent care of them. It is not a question of economy, but of good management.—Baltimore American.

THE UINTA AND THE UNCOMPAHGRE ASPHALTITES OF UTAH.

Recently the Washington news reports have contained frequent mention of the contest over the opening for settlement, first of the Uncompahgre, later of both that and the Uinta reservation, in the northeast corner of Utah, or rather near the corner of the state where Wyoming forms the northern boundary and Colorado the eastern. The keen interest aroused was mainly due to the unique occurrence of asphaltites in nearly vertical fissures, and their economic value, owing to their remarkable purity, there being nothing in nature with which to compare them; in less degree to the wide stretch of choice timber along the northern part of the Uinta reservation; to the rich farming area, extending up the Duchesne river for fifty miles from its mouth, and to hopeful showings of gold and copper.

While the maneuvers to secure title to these valuable asphaltites are here out of place, it is to be noted that on June 3, 1897, a measure passed both houses of Congress providing for the allotment of homesteads for the Indians in the Uncompahgre, and for the opening of the remainder of the reservation to settlement on April 15, 1898, excepting, however, land on which are these hydrocarbons. The possession, or location, of these deposits was reserved for future congressional action, so the question whether these tracts are later to be leased by the government or can be located on as other mineral lands, will be again fought over. No action was taken concerning the Uinta reservation, and, as the Uncompahgre agricultural lands are quite limited it is probable that after the Indian allotments there will be but little left for settlers.

Parenthetically, the geological survey has issued a decree fixing the correct orthography as "Uinta," not "Uintah," and the asphaltite of widest distribution and greatest commercial moment is mineralogically styled uintaite, though gilsonite—from S. H. Gilson, a second or later discoverer—is the common trade term. It is hard for many to part with this final "h," particularly as only the latest government maps adopt this up-to-date orthography. Some assert that it is a gross

interference with state rights, for Uintah is the name both of a county and town, and neither will part with its "h" without war. As soon expect Utah to be peacefully abbreviated to "Uta."

Two companies have acquired ownership to valuable asphaltic deposits, by some means not altogether understood in the West, though varied tales have been told in type of how it happened, each differing materially according to environment and bias. By a special congressional or other providence, or happy combinations, the Gilsonite-Asphaltum company of St. Louis somehow secured possession to eight full claims on the strike of a gilsonite vein; or about two miles in the heart of the Uinta reservation, three miles distant from the military post of Fort Duchesne. "The Strip" has a stirring history, foreign to the purpose of this article. It is alleged that the royalty stipulated in the special act of congress cutting "The Strip" out of the Uinta, to be paid annually for the benefit of the government's wards, has never been paid nor has any accounting been made. On the other hand, the Assyrian Asphaltum company of Chicago is the fortunate residuary legatee from the erratic jog of a mile to one side left in running a portion of the west line of the Uncompahgre boundary and in meanderings of the southern limit of the Uinta reservation.

From an interesting monograph on these deposits by George Homans Eldridge, given in the Report of the Geological Survey for 1895-6, extracts are taken on the rock and vein formation. In the Uinta basin are a succession of vertical rocks through sandstones, shales, etc., filled with uintaite. These fissures vary in width from a fraction of an inch to twenty feet, and in length from a quarter of a mile to ten miles or more. The walls are smooth and regular. In mining the material a pick is the only tool used, blasting being unnecessary, if not hazardous. All the veins are approximately parallel, their strike varying from north 35 degrees west to north 55 degrees west, and, with the exception of an occasional short transverse throw, they are absolutely straight in trend. A peculiarity attending the occurrence of these fissures is that though generally parallel with the strike of the strata and the trend of the mountain ranges, in a few instances they cut the strata diagonally to the strike. None of the veins show the irregularities of fissures formed by the tearing asunder of strata, nor are there the evidences of the walls having rubbed against each other that would be apparent had their occurrence been due to displacement.

It has been suggested by Mr. Henry Wurtz—after whom one of the inferior hydrocarbons is named—that these cracks may be shrinkage fissures, due to a former condition of great heat, followed by irregular cooling. This view is not entertained by Mr. Eldridge, who advances the probability of their having been formed in the folding of the strata of the Uinta Basin syncline, the strata being torn asunder from below upward, instead of as in an anticline, from above downward.

These hydrocarbons occur over an approximate area of 10,000 square miles. Uintaite is found chiefly in the Uncompahgre; though of the two properties now worked the one owned by the Gilsonite Asphaltum company is in the north angle between the two reservations, while the Assyrian Asphaltum company's uintaite mine is in the oddly formed niche to the south, left out of the boundary of either reservation. The associate members of the hydrocarbon series, elaterite, wurtzilite and albertite, occur in the southern part of the Uinta; ozokerite—mineral wax—appears in pockets in the vicinity of Soldier Summit, the divide between the Great Basin and the Colorado river; the asphaltic limestones, so far as exploited, are found in Spanish Fork canyon and vicinity, while the asphaltic sandstones are widely distributed throughout this area.

The Duchesne vein, owned by the Gilsonite Asphaltum company, three miles east of Fort Duchesne, has a trend north 40 degrees west, is three to four feet wide in the mile and a half tested, beyond which it gradually narrows, though it is traceable for three-fourths of a mile in either direction. Mining is carried on at a depth of 200 feet and the management states there are fully 300,000 tons of uintaite in sight. Supposing that the vein continues at least 1,300 feet in depth, equal to the proven thickness of the formation as shown in the canyon of Green river, the estimate of probable tonnage is 2,000,000. The average output at present is 100 tons a month, which is limited only by the demand. From Fort Duchesne the material is hauled by wagon ninety miles to Price station, on the Rio Grande Western railway, thence shipped to St. Louis and elsewhere.

Mr. Eldridge when engaged in field work found twenty-five separate and distinct uintaite cracks or fissures on the Uncompahgre, besides the Duchesne vein, of which detailed mention is given.

The Gilsonite Asphaltum company is capitalized for $500,000. C. O. Baxter is president; W. F. Nolker, vice-president; H. E. Naffy, secretary-treasurer, all of St. Louis, and B. Seabolt is superintendent, his address being Fort Duchesne, Utah. The New York office is 82 John street, and A. Bruntsch, Hamburg, Germany, is the European agent.

The uintaite vein of the Assyrian Asphaltum company is at Pariette, near the southeast corner of Wasatch county, in the cape or promontory of the public domain, a valuable tract that oddly separates the two reservations. It is known, colloquially, as the Culmer vein, and is 10 inches to 2 feet wide. From its northwest extremity it is explored two miles, to the west line of the Uncompahgre Reservation, though the vein is traced for eight miles, on its strike, to the southeast. In the two miles worked it is stoped out—if the term is orthodox—15 to 155 feet deep; regardless of the narrow width, even when but 10 inches, the uintaite is all removed without breaking any wall rock. There is also quite a plant at Salt Lake.

The capitalization of the Assyrian Asphaltum company is $450,000, or 4,500 shares of a par value of $100. The officers are J. P. Mallette, president; G. F. Culmer, vice-president and general manager; J. F. Hill, secretary-treasurer, and the head office is 311 Tacoma Building, Chicago.

Uintaite mining is not without attendant dangers, the greatest difficulty being to supply good ventilation. To prevent the accumulation of fire-damp the wells are frequently washed with a copious deluge of

water, to deaden the dust containing the explosive gases, and with underground lights ten-fold more care is taken than in a coal mine. Despite all precautions two disastrous explosions occurred in the Duchesne vein, the more recent in November, 1896, when two miners were killed underground and three freighters, standing 300 yards from the vein, were seriously injured.

Prof. H. Hirsching has analyzed numerous samples of uintaite and found a high percentage of light carburetted hydrogen compounds, free hydrogen and free oxygen. As the vein-filling is broken and disintegrated by mining, these inflammable and explosive gases are released. In the explosion of last November the vein was one mass of flames, and it was only after days of labor and the most strenuous efforts that the conflagration was extinguished.

Commonly uintaite is called gum asphaltum. As mined it is almost absolutely pure, in which respect it differs widely from the asphaltites of Trinidad or California. The government analysis of uintaite shows it to be 99.99 pure; in other words it is wholly soluble in benzine, turpentine or kindred hydrocarbon solvents. It contains: Volatile matter, 56.46 per cent.; fixed residue, 43.43 per cent.; ash, 0.10 per cent.

Its economic value has hardly begun to be appreciated. One of its first uses was as a base for black varnishes, paints and baking japans. It is a perfect non-conductor and has no superior for insulating, being lighter, less friable and better in every respect than glass; it is valuable also for roofing material, while as a dip for pipe or wire the film it leaves prevents oxidation and resists the corroding action of acids. A recent use is a dressing for leather and in one form it furnishes a splendid imitation of patent leather. The writer can testify to its wonderful rejuvenating power when applied to obsolete shoes. A cheap by-product finds a market for coating fence-post, piles, railroad ties and the like. Its wonderful elasticity is shown by coating leather, tin or sheet iron with an unitaite solution, then bending or twisting the material into all kinds of shapes. So long as the leather or metal does not break it is impossible to crack the uintaite film.

The Uinta basin has other hydrocarbons, attractive from their mode of occurrence and character, but they do not possess the economic value of uintaite. One, not classed by Mr. Eldridge, is styled utahite, possessing a distinctive fracture from uintaite, which is eminently conchoidal. Utahite is partially vulcanized and only about 40 per cent is soluble, the remainder being fixed bitumen.

Albertite gives the same analysis as uintaite, though it is wholly insoluble; hence, of course, it has no economic value.

Elaterite—mineral caoutchouc—is partially vulcanized asphaltum. It is said to be the most elastic substance known. Some hold that it possesses many useful qualities, while others claim there is no place in the arts or trade that is not better filled by uintaite. According to its champions it has no equal as an ingredient in roofing mixes.

Of the cereous hydrocarbons ozokerite is the most important, while its occurrence is the most circumscribed. It is the mineral wax of commerce, readily selling for $80 per ton in New York; it is used in making catherdal tapers. Bees are said to prefer ozokerite to wax of their own manufacture. Near Soldier Summit it was found in pockets, but the natural supply seems nearly exhausted and an artificial ozokerite is now made from uintaite by-products by a secret process of the Assyrian Asphaltum company.

Scarcely second in importance to these unique hydrocarbons are the asphaltic limestones and sandstones, occurring in seams along the western rim of Uinta Basin, which form the very best paving mixes.

The present principal source of supply is from a fork of Spanish Fork canyon where there is an asphaltic limestone blanket vein two to ten feet thick. In Chicago, where it is made into paving mixes, it is known as lime-rock asphalt and it is said to closely resemble the choice Swiss asphalt. The average of the vein yields a product of two and one-half feet, classified as No. 1 and one and one-half feet of No. 2. Underlying this is six feet of magnesian limestone carrying a small percentage of bitumen of no market moment, then one and one-half feet of No. 1. The vein is reached by two tunnels, 165 feet and 465 feet long respectively, and there is a good system of ventilation provided.

Analyses of this lime-rock show a maximum of 72 per cent. soluble bitumen and 11 per cent. fixed bitumen, the remainder being magnesian carbonate of lime and silica. A general average, however, of 22 per cent. soluble bitumen is maintained; in the operations of 1896 the average for the year was 29.70 per cent. bitumen, soluble and fixed. A characteristic not shared by the Trinidad or other asphaltums is the absence of organic matter.

Utah asphaltum was used for paving streets of the business portion of Salt Lake in 1890 and that first put down has endured the traffic of seven years. No repairs have anywhere been made, nor are any needed. This pavement is entirely sanitary, smooth, elastic, nearly noiseless and laid on a tamped 6-inch concrete base, as in Salt Lake, it is pre-eminently durable. After six years of traffic a section was taken from one of the busiest streets to exhibit to the city engineer and members of the council of Columbus, O. It was without the slightest fracture or crack, either from evaporation or the constant impact of wagon wheels. In Chicago seven miles of streets are paved with Utah asphaltum; it has given satisfaction in Minneapolis; Columbus, O., has adopted it, and wherever it has been fairly tried its superiority is recognized.

At the present time the Gilsonite Asphaltum company gets its paving material from the Indian Territory, as there is nothing suitable on their Utah ground for this purpose. It has been said that gilsonite-uintaite forms an important part in some of the best paving mixes. This is not true. A very little has been used in some mixes, though its utility is questionable.

The shipments of Utah uintaite and asphaltum products, according to the forthcoming volume of The Mineral Industry, reached the total of 3,537,355 pounds in 1895, and of 4,137,800 pounds in 1896.—From the Engineering and Mining Journal.

IMPROVEMENT AND CONTRACTING NEWS

PAVING.

Denver, Col.—The board of public works decided July 7 to admit Alcatraz asphalt to competition.

Philadelphia, Pa.—The supreme court heard arguments July 5 in the asphalt paving case between Henry C. Carroll and this city.

Reading, Pa.—The Alcatraz Paving company has brought suit against Samuel S. Hoff, city engineer, to recover damages for a statement he made derogatory to the company.

New Haven, Conn.—The board of public works has been abolished and under the new charter the work of the board will be done by the director of public works.

Boston, Mass.—An order was passed recently requesting the superintendent of streets to report an estimate of the cost of asphalting the gutter on each side street paved with granite blocks for bicycle paths.

Chicago, Ill.—Mayor Harrison has named paving inspectors in the street department as follows: August Moe, D. J. Lamer, John Mayer, C. J. Tuite, John O'Brien, P. Hurley, R. Romano, Thomas Roach, P. O. McLaughlin, W. H. Buell.

Tacoma, Wash.—The Little Falls Fire Clay Works has proposed to Commissioner of Public Works Doherty to furnish sufficient vitrified brick to put down a sample pavement between the city hall and the Northern Pacific railway general office building, on Pacific avenue.

Meridian, Miss.—The municipal boards have decided to use one-half the money now on hand for putting down one-half vitrified brick paving and one-half chert paving. The council and aldermen have been divided a long time on the question. The bids for the work were received several weeks ago.

Newark, N. J.—The board of works passed a motion June 30 requesting the city council to prepare a form of ordinance under which the board would require a ten-year guarantee on all asphalt paving contracts, and that a portion of the amount of the contract could be retained to provide for the payment for repairs to the pavement during the last five years of the period for which the pavement is guaranteed.

Boston, Mass.—(Special)—The states of New York and Massachusetts are to make a joint survey to restore the marking of the boundary. C. H. Flanigan, C. E., of Albany, N. Y., and Sidney Smith, C. E., of Boston have been appointed officials for their respective states to make the surveys. The line is straight for about fifty miles. Fine instruments have been secured for the work, which will enable them to sight from Alander to Berlin mountain, a distance of forty miles.

Kansas City, Mo.—A report was presented to the comomn council July 7 to the effect that the contract with the Parker-Washington company for paving Sixteenth street, from Oak to Locust, be not confirmed and that no more bids from that company for laying Trinidad asphalt pavements be considered until it presents satisfactory proofs that it has that material. Some of the members of the board of public works are also reported as opposed to awarding any more contracts to the Gilson Asphaltum company until it can demonstrate that it is prepared to lay a better class of pavement.

Detroit, Mich.—Alderman Merrell has suggested that Mayor Maybury veto the asphalt repaving contract and that worn out asphalt surface on streets be resurfaced. He explained that by the contract before the council the repairs in the coming five years will cost $1.25 a yard. The Alcatraz company bid about $1.35 for the surface of asphalt to be laid on Jefferson avenue, between Mt. Elliot avenue and the boulevard. It would be cheapest in the end to lay an entirely new surface on the stret on a ten-year guarantee at $1.35 a yard, than to pay $1.25 a yard for keeping the same streets in repair five years. Commissioner Moreland concurs with Alderman Merrell in his opinion.

New York, N. Y.—(Special.)—New York City has authorized the repaving of streets with asphalt, covering an area of 325,351 square yards; estimated cost, $869,315.20 for the present year. During the first quarter, ending March 31, thirteen contracts, covering 95,975 square yards, were let at an average of $3.08 per square yard, including fifteen years' maintenance. This is 12 cents per square yard less than the average of the lowest bids received in 1896.

CONTEMPLATED WORK.

Brockwayville, Pa.—Street paving is contemplated.

Owosso, Mich.—About $35,000 worth of paving will be done this year.

Oswego, N. Y.—Plans have been ordered prepared for asphalt paving in W. Mohawk street.

Lowell, Mass.—The order to pave Charles street with asphaltina has passed.

Richmond, Va.—Resolutions have been adopted for a number of street improvements.

Rockford, Ill.—The question of paving Haskell avenue with asphalt is being agitated.

Mt. Gilead, O.—The council is considering the question of extending the paved streets.

Reading, Pa.—Asphalt paving is contemplated for Eighth street, from Penn to Bingaman.

Lowell, Mass.—The question of paving Gorham and Chelmsford streets is being considered.

Anoka, Minn.—Bonds will be issued at once for improving the county roads. J. T. Elwell.

Spokane, Wash.—The city council has about decided upon asphalt paving for this city.

Wallingford, Conn.—An appropriation of $3,000 has been made for macadamizing roads.

Raleigh, N. C.—This city will vote Sept. 7 on issuing $50,000 of street improvement bonds.

Omaha, Neb.—The board of public works is considering a plan for macadam paving on Center street.

Freeport, Ill.—The council has voted to pave parts of Clark and N. Galena avenues with brick.

Perth Amboy, N. J.—Telford-macadam paving is contemplated for about 1,400 feet of Hall avenue.

Soiux City, Ia.—The council has passed a resolution for paving Pierce street with asphalt, July 20.

Macon, Ga.—The city engineer is making specifications for paving Fourth street with granite cubes.

Canton, O.—(Special.)—Plans are being prepared for paving W. Lake and W. Tenth streets and curbing Savannah avenue.

Paterson, N. J.—Resolutions have been passed for paving Hamilton, Colt and Ellison streets with asphalt.

Waukesha, Wis.—The city council has decided to order brick paving on Main street from Maple avenue to Barstow street.

Lincoln, Neb.—The city council is agitating the question of repaving O street from Ninth to Twenty-seventh.

Newburn, Tenn.—This city voted, July 15, to issue $5,000 in bonds for street improvements. J. S. McCorkle, mayor.

Lincoln, Neb.—The streets of this city are in a very bad condition and in need of paving and repaving.

Milwaukee, Wis.—A resolution has been adopted to pave Prospect avenue from Brady street to Kane place with asphalt.

Clinton, Ia.—The city engineer will prepare plans for macadamizing and curbing Third avenue between Fourth and Fifth.

Baltimore, Md.—A cycle path of asphalt blocks will be laid across North avenue to connect with the paving on Eutaw street.

Mexico, Mo.—The city council has ordered the sum of $3,500 set aside for the exclusive use in macadamizing the streets.

Oneida, N. Y.—An extension of the vitrified brick paving on Main street from Madison square to Lenox avenue is contemulated.

Atlanta, Ga.—The street committee has recommended that Auburn avenue from Butler to Hilliard street be paved with asphalt.

New Bedford, Mass.—The board of public works ordered curbing and concrete walks constructed in a number of streets, July 20.

Kansas City Mo.—The property-owners on Park avenue between Ninth and Twelfth streets have petitioned for Trinidad lake asphalt paving.

New Orleans, La.—The city council has advertised its intention to pave Tulane avenue from Hagan to Carrollton avenue with asphalt.

Sedalia, Mo.—An ordinance has passed first reading providing for vitrified brick paving on Kentucky avenue from Seventh to Broadway.

Marion, O.—A resolution has been passed for macadamizing Mt. Vernon avenue from Church street to Grand avenue. James I. Beatty, city clerk.

Ottumwa, Ia.—(Special.)—John T. Brady, city engineer, says that 15,000 square yards of brick on sand foundation will be laid on Fourth, Second, Market and Jefferson streets.

Bluffton, Ind.—Surveys and plans are being made for from four to six miles of asphalt paving this summer. W. H. Ward, Muncie, Ind., engineer.

New Rochelle, N. Y.—The question of issuing $25,000 in bonds for street improvements, will be voted on Aug. 3. H. D. Elderkin, town clerk.

West Hartford, Conn.—At a special town meeting held July 8, an appropriation of $4,000 was voted to macadamize the south end of Prospect avenue.

Portland, Ore.—The property-owners on Alder street from First to Sixth have petitioned for vitrified brick paving on a concrete foundation.

Ottumwa, Ia.—Paving was ordered July 19, from Second street to Jefferson; N. Market street from Fifth to E. Court; N. Jefferson from Fifth to Gara.

Averyville, N. Y.—The board of village trustees have appointed a committee to make estimates of the cost of improving Madison avenue through this village.

Tonawanda, N. Y.—The tax-payers on S. Niagara street, between Ellicott street and Pains avenue, have petitioned for flag stone paving for that street.

Kalamazoo, Mich.—Brick has been suggested for making crosswalks instead of wood. This city has about 300 crosswalks which should be replaced or repaired.

Massillon, O.—Richville avenue, East street, W. Tremont and Grant streets will be graded, graveled, curbed and guttered. Resolutions for this work were adopted July 20.

Lake Bluff, Ill.—John Henderson, John Nordstrand and William Wadner, who have been appointed street commissioners, have reported in favor of macadamizing three streets at once.

Decatur, Ill.—Broadway, Sangamon, Morgan, Herkimer, Jasper, Eldorado, N. Main and Wood streets will be paved this year. The other ordinances will go over until next year.

Rockville, Ind.—Florida township has voted to build ten miles of new gravel road at an estimated cost of $15,000, which will give this county 190 miles of free gravel roads.

Bloomington, Ill.—Asphalt paving is proposed for E. Grove street. A petition has been presented to the city council asking that Monroe street, from East to Gridley, be paved with brick.

Wilkesbarre, Pa.—Several citizens on Wyoming avenue, Dorranceton, have had plans and specifications made at their own expense for paving about 2,000 feet of Wyoming avenue with telford macadam.

Grand Rapids, Mich.—The common council has ordered asphalt paving on 6-inch concrete on Fountain street, from Ottawa to N. Division; brick paving on S. Division street, from Button avenue, to the D. G. R. & W. R. R.

Hartford, Conn.—The board of street commissioners has voted to have portions of Trumbull, Windsor, Village and other streets paved with asphalt, and sundry streets with granite. Chas. H. Northam, president board street commissioners.

Springfield, Ill.—Ordinances have been passed for paving with brick a large number of streets, but little of it will be done this year. Contracts will be let in a few weeks for a few short thoroughfares.

Philipsburg, Pa.—The estimated cost of the borough's share for paving the public square, street crossing and Spruce street, from Front to Ninth, Pine, from Front to Third, and Presque-isle, from Second to Fourth, is $10,000.

Sandusky, O.—Resolutions were introduced in the council July 19 for improving Mills street, south from Tiffin avenue to the railway tracks, and Central avenue, from Monroe to N. Depot street. The resolution for paving Wayne street with asphalt, block asphalt or brick was defeated.

Rochester, N. Y.—Ordinances were introduced July 20 for new curb stones and rebuilding the asphalt pavement for three feet on each side of Alexander street, from Monroe avenue to East avenue. Hayden block paving will be laid at the Lake avenue entrance of Lake View Park.

North Adams, Mass.—The city council has ordered the paving of Marshall street, with granite, at an estimated cost of $11,000; Main street to State street, with granite, $9,600, and Main streets, from State to the Baptist Church, with vitrified brick, $12,500.

Albany, N. Y.—Mayor Thacher has approved laws for repaving Hamilton street, from S. Pearl to Quay, with granite blocks; Ash Grove, from Grand street to Trinity, and Westerlo street, from Trinity Place to E. Pearl, with brick; Eagle street, from Bleecker Place to Madison avenue, granite block.

Quincy, Ill.—A resolution has been adopted to refer the entire matter relating to the grading and improvement of Locust boulevard to the boulevard improvement committee with instructions to agree on modified specifications for doing the work and then advertise for new bids.

Grand Rapids, Mich.—The residents on Paris avenue, between Cherry street and Wealthy avenue, and N. Prospect street, between Washington and Lyon, have asked for asphalt paving. The council has been asked to reconsider its action authorizing the grading of the east end of Lake avenue and authorize cedar block paving on gravel instead.

St. Paul, Minn.—The board of public works has recommended that Hill and Washington streets, from Third to Eagle, be macadamized and the gutters paved with brick. The board reported adversely on the question of repaving Market street, but will have it repaired, with the understanding that it be repaved next year.

Camden, N. J.—A number of the main thoroughfares of this city will be paved with asphalt, and the first to receive consideration will be Market street, from Front to Federal; Federal, from Front to Cooper's creek; Kaighn avenue, from Front to Haddon avenue; Broadway, from Federal to Emerald street; Haddon avenue, from Federal to Line; Cooper street, from Delaware avenue to the Camden & Atlantic railroad.

Albany, N. Y.—Vitrified brick paving was recommended for Lexington avenue, from Washington avenue to Second street, and Second street, from Quail to Ontario, July 19. Brick paving is also proposed for Livingston avenue, from Knox to Thornton; Second, from Ontario street to New York Central avenue; Morton street, from Knox street to Lexington avenue; Van Woert street, from Broadway to Swan. The law for paving Yates street with Trinidad asphalt will come up again for passage.

New York City, N. Y.—(Special.)—The Board of Aldermen and mayor have approved papers recently as follows: Authorizing the superintendent of street improvements of the Twenty-third and Twenty-fourth wards to expend a sum not to exceed $3,000 without public letting in the repairs of East 161st street at Cromwell's creek; directing the commissioner of public works to repave the carriage way of East 124th street, from St. Nicholas avenue to Seventh avenue, with asphalt pavement on the present pavement, and Lexington avenue, from 97th to 101st street with asphalt block on concrete foundation; 108th street, from Central park west to Columbus avenue, asphalt pavement on concrete foundation; 153rd street from Seventh avenue to McComb's Dam hotel, asphalt block on concrete foundation; 114th street, from Amsterdam avenue to Riverside drive, asphalt block pavement on concrete foundation; 139th street from Hamilton place to Boulevard, with granite or syenite pavement on concrete foundation.

CONTRACTS TO BE LET.

Elmwood Place, O.—The village clerk was authorized July 21 to ask for bids for improving McGregor avenue.

Meriden, Conn.—The contract for improving the Old Colony road will probably be let about the middle of August.

St. Charles, Mo.—Bids will be received until Aug. 7 for paving Main street from Clay to Lewis.

Indianapolis, Ind.—Bids are asked until Aug. 2 for paving Hudson street with brick. M. A. Downing, chairman board of public works.

Des Moines, Ia.—Bids are asked until Aug. 3 for paving two alleys with brick. George C. Sims, chairman board of public works.

Hoboken, N. J.—Bids are asked until Aug. 4 for paving sundry streets with asphalt. M. V. McDermott, city clerk.

Omaha, Neb.—Bids are asked until Aug. 10 for paving Military road with brick or stone. M. H. Redfield, county clerk.

Painesville, O.—Bids will be received until Aug. 3 for 8,800 square yards of brick paving on Maiden lane. E. D. Heartwell, village clerk.

Washington, D. C.—Bids are asked until Aug. 10 for laying cement sidewalks in the District of Columbia. John W. Ross, commissioner District of Columbia.

Freedom, Pa.—Sealed proposals will be received until Aug. 4 for paving one mile of Main street with brick. S. Morgan, president town council.

Wabash, Ind.—The city was authorized July 15 to advertise for sealed proposals for paving Canal street, from Wabash to Miami, with asphalt.

Albany, N. Y.—Bids are asked until Aug. 2 for brick paving in portions of Oak, Elk and Benjamin streets. Thomas J. Lanahan, clerk board contract.

New Philadelphia, O.—Sealed proposals will be received until Aug. 13, for paving the public square with brick; certified check, $100. I. A. Correll, city clerk.

Cincinnati, O.—Sealed proposals will be received until Aug. 4 for paving with brick

Eggleston, Spinning and Van Seggern alleys. Aug. Herrmann, president board of aldermen.

Sewickley, Pa.—Sealed proposals will be received until Aug. 3 for paving with asphalt and curbing Broad street, from Beaver street to Centennial avenue. Dr. S. D. Jennigs, chairman street commissioners.

Buffalo, N. Y.—Sealed proposals will be received until Aug. 5 for paving with asphalt, Medina stone or brick portions of Langdon and Chenango streets. R. G. Parsons, secretary board of public works.

Evansville, Ind.—Sealed proposals will be received until Aug. 7 for grading Cleveland avenue, from Main street to Evansville and Princeton state road. Geo. W. Swearingen, clerk board of public works.

Peoria, Ill.—Bids are asked until Aug. 3 for furnishing and constructing about 7,400 square yards of asphalt paving, cement curb and gutter on Ravine avenue. M. W. Manning, commissioner public works.

Toledo, O.—Sealed proposals will be received until Aug. 16 for paving Western avenue, from the M. & E. canal to Hawley street, with vitrified brick or block. Lem. P. Harris, city clerk.

Lansdowne, Pa.—Bids are asked until Aug. 6 for grading Windermere avenue, from Baltimore to La Crosse avenue, and for repairs to the gutter on a portion of Runnymede avenue. H. L. Warren, secretary.

Olean, N. Y.—Sealed proposals will be received until Aug. 4 for 300 yards of paving and 900 lineal feet of curbing on South street, between Union and Berry streets. K. E. Allen, superintendent of streets.

Van Wert, O.—Sealed proposals will be received until Aug. 16 for about 10,090 square yards of brick paving on W. Crawford street and South avenue, from Washington to Shannon street. C. F. Manship, city clerk.

Cincinnati, O.—Sealed proposals will be received until Aug. 6 for keeping in repair for a period of five years, sundry streets which have been improved with asphalt. A. P. Butterfield, clerk.

Oberlin, O.—Sealed proposals will be received until Aug. 17 for paving with brick E. Lorain street, from N. Main to N. Water, and E. College from N. Pleasant to Spring. Chas. Seth Brown, village clerk.

Marion, Ind.—Sealed bids will be received until Aug. 3 for improving First street, from Western to Butler avenue, and until Aug. 17 for improving Gallatin and Race streets. John Watts, city clerk.

Morristown, N. J.—Bids are asked until Aug. 3 for about 55,700 square yards of macadam or telford paving in Chester, Mendham, Morris and Rockaway townships. Merritt B. Lum, director board freeholders.

Cleveland, O.—Sealed proposals will be received until Aug. 6 for paving with brick and curbing sundry streets. Bids will be received until Aug. 9 for paving with asphalt and curbing several streets. George R. Warden, director public works.

Fargo, N. D.—Bids will be received until Aug. 14 for grading and laying a tile sidewalk on the south side of the court house square; tile sidewalk and stone curbing on the east side of the court house square. O. J. Olson, county auditor.

Toledo, O.—Sealed proposals will be received until Aug. 2 for paving with Trinidad Pitch Lake asphalt Lawrence avenue, from Bancroft street to Delaware avenue, with vitrified blocks; Bush street, from Summit to Michigan. Lem. P. Harris, city clerk.

Warren, O.—Sealed proposals will be received until Aug. 3 for furnishing about 2,657 square yards of vitrified paving brick; $300 bonds. Sealed proposals will be received until Aug. 4 for constructing about 2,857 square yards of brick paving on S. Park avenue; $300. Albert E. Andrews, city clerk.

Crawfordsville, Ind.—Sealed proposals will be received until Aug. 2 for paving with brick Meadow street, from Main to Pike; cement curb south side Park street, from Grant avenue to Walnut street; cement walk, Maple street from Market to Binford; graveling Lane avenue. J. D. Tracey, city clerk.

Buffalo, N. Y.—The Aldermanic street committee rejected all the bids July 22 for paving Jefferson street with asphalt and will advertise for new proposals. The ten-year guarantee clause has been adopted, as well as a resolution including Alcatraz asphalt in the specifications for street paving.

New York, N. Y.—Bids are asked until Aug. 3 for paving Mosholu avenue and parkway with telford, and the Boston road in Bronx park with macadam. Samuel McClellan, commissioner public works. Bids will be received until Aug. 3 for furnishing and putting in place riprap stone. Ed C. O'Brien, department docks.

Hamilton, O.—Sealed proposals will be received until Aug. 9 for paving with sheet asphalt block asphalt or vitrified brick, Main street, from A to Millville avenue, 15,700 square yards, and 4,000 lineal feet curbing. Bids are asked until Aug. 21 for asphalt or brick paving on S. Third street. M. O. Burns, clerk board sewer commissioners.

Marion, O.—Sealed proposals will be received until Aug. 10 for improving Bellefontaine avenue. The work consists, approximately, of 6,500 cubic yards of grading, 8,000 lineal feet straight curbing, 110 lineal feet circular curbing, 300 lineal feet abutment stone, sixteen catch-basins, 5,000 feet 12-inch drain tile, 3,000 feet 10-inch drain tile, 15,500 square yards macadamizing. Cash deposit, $500. James I. Beatty, city clerk.

CONTRACTS AWARDED.

Wheeling, W. Va.—Criswell & Arkle have been awarded a contract for curbing and paving.

Dubuque, Ia.—Brown & Brown have been awarded the contract for paving Iowa street with brick at $1.27 a square yard.

Jamestown, N. Y.—The contract for paving Footes avenue was awarded to the Jamestown Construction company for $22,091.

Johnstown, Pa.—The contract for paving Main street with brick has been awarded to J. R. Harris of Catskill.

Adrian, Mich.—The city council has awarded the brick paving contracts to Thos. McKinney & Sons, of Toledo, O.

Menasha, Wis.—The contract for macadamizing Washington street, was awarded to H. A. Schmitz, of Racine, for $5,722.

Manchester, N. H.—The contract for paving Granite street with concrete has been awarded to the Chas. H. Robie Concrete company.

Southfield (L. I.), N. Y.—D. C. McManus, Orange, N. J., was awarded the contract

July 15 for about twenty miles of macadam roads.

Brazil, Ind.—Keegan & Fitzpatrick secured the contract for seven miles of highways in Posey township for $24,967.88.

Baltimore, Md.—The contract for paving and curbing Castle street, between Monument and Eager, was awarded to Patrick Reddington.

Webster, Mass.—The contract for building 14,000 square yards of macadam road was awarded to A. J. Wellington, of Boston, for for $8,986.60.

Flint, Mich.—The contract for paving Saginaw street with brick was awarded to Hurley & Smith, of this city, for $10,612.36.

Kane, Pa.—The contract for 6,200 square yards of brick paving on Fraley street was awarded July 12 to Contractor McLeod of Olean, N. Y.

Pine Bluff, Ark.—The contract for brick paving was awarded July 12 to John H. Talbot & Co., of Montgomery Ala., and Shreveport, La.

Glen Ridge, N. J.—The contract for constructing about eight miles of telford road has been awarded to Osborne & Marcelles, of Montclair.

Brownstown, Ind.—The contract for constructing twenty-two miles of gravel roads in Owen township was awarded to L. P. Byrne, of Seymour, for $16,000.

Harrison, N. J.—The contract for paving Fourth street from the Pennsylvania railroad to Salem street, was awarded July 20 to B. M. and J. F. Shanley for $10,474.60.

Newark, N. J.—The board of works awarded, June 30, the contract for paving New street with sheet asphalt to the New Jersey Asphalt Co., at $2.35 a square yard.

Lowell, Mass.—The contract for constructing a section of State highway in this city has been awarded to A. J. Wellington, of Boston, for $6,976.40.

Albany, N. Y.—The contract for paving Second street from Knox to Judson with vitrified brick, was awarded July 6 to Edward F. Dillon for $13,699.20.

Clinton, Mass.—Joseph D. Gennaro, Boston, was awarded the contract, July 9, for constructing the new highway from Boylston to Clinton, for $10,201.

Memphis, Tenn.—The contract for paving Front street, from Beach to Poplar, with granite, was awarded July 14 to L. F. Kavanaugh, at $2.19¾ a square yard.

Sullivan, Ind.—The contract for constructing seven miles of gravel roads was awarded July 15 to Joseph Hart, auditor of Switzerland county, for $13,700.

Minneapolis, Minn.—The contract for paving Seventh street from Hennepin avenue to Seventh avenue, S., with brick was awarded to John Fleetham at $2 a square yard.

Pomeroy, O.—(Special.)—E. R. Davenport, city engineer, says that Kelly & Berry, of Portsmouth, O., were the successful bidders for street paving in this city.

Auburn, N. Y.—S. C. Adams & Son secured the contract for paving four streets with brick at $1.96 a square yard. Block or pressed brick will be used.

Clearfield, Pa.—The contract for constructing 5,000 square yards of brick paving and 3,600 feet of curb has been awarded to W. B. Hughes of this city as follows: Paving, 85 cents a square yard; curb, 46½ cents a lineal foot.

Cleveland, O.—W. H. Ford & Co. secured the contract July 8 for constructing telford roads and walks in section No. 2 of the Rockefeller park for $38,673.

Shelbyville, Ky.—The contract for paving Main street with brick was awarded July 8 to Charles Stilger of Louisville, Ky., at $17.40 per square. Mack block will be used.

Scranton, Pa.—The contract for repairing the asphalt pavements was awarded July 8 to Dunn Bros., as follows: Patching, $1.30 a square yard; concrete and asphalt, $4.60 a cubic yard.

Erie, Pa.—Paving contracts have been awarded as follows: Holland street, brick, John McCormick & Son, $8,725; Sassafras street, Mayer Bros., $6,339.10. The bids were received July 15.

New Haven, Conn.—The Boston Asphalt company secured the contract for laying an asphalt pavement on the roadways to the new railroad bridge at Chapel street. Sicilian rock asphalt will be used.

Kansas City, Mo.—Contracts for paving were awarded July 14 as follows: Oak street, Gilson asphalt company, $2.10 per square yard; Twenty-ninth, Charlotte and Campbell streets, Barber Asphalt Paving company, $2.12 a square yard.

Hagerstown, Md.—The contract for paving the public square has been awarded to E. G. Buck of Bedford City, Va., at $1.29 a square yard. McMahon & Porter repressed brick with Murphy grout filler will be used.

Boston, Mass.—Contracts for building new macadam roads in Dorchester have been awarded as follows: Ellet street, H. Gore & Co., $966.35; Chamberlain street, Collins & Ham, $1,142.32; Wolcott street, Collins & Ham, $1,229.51.

Keokuk, Ia.—The contract for furnishing the United States government with 30,000 cubic yards of rock to be used on river improvements between Ft. Madison and Burlington was awarde July 19 to McManus & Tucker of this city.

Hartford, Conn.—The contract for grading highways Nos. 2 and 3, in Pipe park was awarded to Thomas Stafford for $1,292, and for widening Park street, from Zion to Bartholomew avenue to Fred T. Ley & Co. of Springfield, Mass., for $1,723.

Galesburg, Ill.—Contracts for brick paving have been awarded as follows: John B. MacAuley, Academy street, $12,210.60; N. Seminary street, $30,827; E. Grove street, $4,541.05; Knox street, $29,859.77; and John Bassler, Academy street, $11,159.90.

Richmond Hill (L. I.), N. Y.—The village trustees at a meeting held July 19, rescinded the contract made with T. B. Murphy for macadamizing the village streets at $1.18 a square yard, and awarded it in two sections to George Fruh at $1.34 and H. J. Mullen at $1.33.

Brooklyn, N. Y.—The lowest bid received July 15 for two miles of asphalt paving on Jamaica avenue, was presented by the Eastern Bermudez company, at $1.15 a square yard. The contract will not be awarded until after Aug. 1, as the bonds cannot be issued before that.

Pittsburg, Pa.—Paving contracts have been awarded as follows: Ridgewood avenue, Ligonier block, Kripps Coal and Sand company, $4,192; Franklin street, Ligonier block, Sloan, McIlvaine & Ott Bros., $10,010.

Detroit, Mich.—The board of public works

awarded contracts, July 20, as follows: Brick paving, Dumesnil street, from Amber to Catalpa, $19.80 per square, T. W. Gosnell; brick, two alleys, $14, William H. Bates; brick sidewalks in several streets, R. W. Gleason, , $44.45.

Lima, O.—The contract for paving W. Market street with asphalt was awarded July 20 to the Columbia Construction company at $1.80½ a square yard. The bids for this work were received July 7. More than a mile of street will be paved, involving an expenditure of about $50,000.

Camden, N. J.—The contract for building a gravel road from Berlin to Hammonton has been awarded to B. F. Sweeten & Son, of this city. W. Baker, of Jersey City, who claims there was discrimination in favor of the local bidder threatens to contest the award.

Brooklyn, N. Y.—Cranford & Co. secured the contracts July 17 for asphalt paving in Berry, Bergen, Butler and Pacific streets and Clermont avenue and Park place at 90 cents a square yard, and the Brooklyn Alcatraz Asphalt company in Fleet and President streets at $1.10 a square yard.

Houston, Tex.—Bids were opened for paving Washington street July 5, and the Barber Asphalt Paving company presented the lowest bid for asphalt paving, W. E. Humphreyville was the lowest on gravel and macadam, and R. C. Storrie on brick. The awarding of the contract was deferred.

Malden, Mass.—Bids were received July 15 for furnishing paving blocks as follows: Pigeon Hill Granite company, Rockport, $59 per thousand; James Reed, Gloucester, $52.80; L. D. Gumb, Lowell, $54; F. E. Newhall, Wakefield, $55; S. and R. J. Lombard, Quincy, $47; Quincy Quarry company, $45.64.

Iowa City, Ia.—The contract for 13,620 square yards of brick paving on Clinton street has been awarded to William Horrabin, of this city, as follows: Paving, six-inch concrete foundation, $1.29 a square yard; excavation, 25 cents a cubic yard; Berea curb, 52 cents a lineal foot; resetting curb, 10 cents a lineal foot.

Washington, D. C.—The contract for furnishing the district with granite curbing was awarded July 1 to S. C. Daby. Vitrified paving blocks—Camden Clay company, 200,000 blocks, $18.60 per thousand; remainder of blocks, McMahon, Porter & Co. and John M. Mack, $20 per thousand.

Hagerstown, Md.—The board of street commissioners awarded the contract June 29 for paving N. Potomac street from Franklin to the Public Square, thence to Baltimore street, to E. G. Buck, of Bedford City, Va., at $1.35 a square yard for McMahon & Porter re-pressed brick and cement filler.

Logansport, Ind.—Contracts for brick paving have been awarded as follows Broadway, from Seventh to Third streets, Lux & Talbott, $21,019.12; Third street, from the bridge over the Wabash river to Broadway, Moellering & Son, Ft. Wayne, Ind., $6,940; Wall street, from Pearl to Fourth, Moellering & Son, $1,050.

Milwaukee, Wis.—Contracts for macadamizing streets were awarded, July 21, as follows: Portions of Thirtd-third, Washington avenue, Thirty-second and Brown streets, John J. Crilley; Burleigh and Bartlett streets, John T. Hoff; Nireteenth street, A. Froeming; Chambers street, Vogt Fuel & Construction Co.; Hackett avenue, Chas. Forrestal.

Middletown, N. Y.—The Preston Brick Co. of Hornellsville, N. Y., presented the lowest bid, July 12, for brick paving in this city, which was 81 cents a square yard. The Eastern Paving Brick Co., Catskill, N. Y., repressed brick, 86½ and 90½ cents a square yard; Mack manufacturing company, wire-cut brick, 94 cents; repressed brick, $1.01; Mack block, $1.01¾.

Boston, Mass.—The contract for constructing and regulating a macadam road on Fullerton street, Roxbury, has been awarded to Philip Doherty for $1,042 and on Turner and Murray streets to Doherty & Connors for $2,030.20 and $1,763.75 respectively. The contract for building 1,600 feet of road in Hadley was awarded to A. J. Wellington for $2,868.

Reading, Pa.—The Pennsylvania Asphalt Co. was awarded the contract, July 8, for paving Pennsylvania street with asphalt on a ten-year guarantee as follows: Sheet asphalt paving, complete, $1.97 a square yard; new granite curbing, $1.13 a lineal foot; granolithic curbing, 70 cents a lineal foot; resetting old curbing, 19 cents a lineal foot; total, $70,696. The bids were received June 28.

Battle Creek, Mich.—(Special.)—John Elsmere, city engineer, says the contract for paving Main and Jefferson street with brick on a six-inch concrete foundation has been awarded to Laidlaw Bros. of Detroit, as follows: Main street, 7,000 square yards; Buckeye block, $1.16 a square yard; Jefferson street, 7,500 square yards, Metropolitan block, $1.15 a square yard; excavation, 18 cents a cubic yard.

Butte, Mont.—The bids received July 14 for paving Main street with granite ranged from $3.76 to $5.60 a square yard, and for curbing from 89 cents to $1.35 a lineal foot. The paving committee decided, July 19, to recommend to the council that the contract be awarded to Silas King Co. at $3.93 a square yard. The curbing contract was awarded to J. E. Sandburg at 89 cents a lineal foot.

Wilmington, Del.—Contracts for furnishing 10,000 square yards of paving bricks were awarded, July 6, as follows: McMahon & Porter Co., New Cumberland, W. Va., fire clay brick, 93 cents a square yard; Chas. Warner Co., City, Montella shale brick, 78 cents; T. B. Townsend Brick & Contracting Co., Zanesville, O., shale blocks, 99 cents. The Brandywine Granite Co. secured the contract for furnishing 5,000 square yards of Belgian blocks at $1.08.

Marshalltown, Ia.—Paving contracts were awarded July 1 as follows: Two courses of brick, State street, from First street to Third avenue, H. B. Hedges, Des Moines, $1.26 a square yard; Church street, from First to Third avenue, J. F. Atkinson & Bros., $1.27; W. Main street, Edward Walsh Construction Co., Davenport, $1.2. The contract for paving E. Church street, from Third to Fourth avenues, with one course brick on concrete, was awarded to Geo. F. Kirby at $1.15 a square yard.

Newport, Ky.—The contract for paving Columbus street with brick was awarded July 15 to VanZandt & Meeds, Cincinnati, O., as follows: Two thousand feet curbing, 5 miles straight, 54 cents; 120 curbing, curbed, 90 cents; 100 feet curbing, old reset, 10 cents; 5,300 square yards paving with brick, 37½ cents; 5,300 square yards, 6-inch

concrete foundation, 54 cents; 100 feet repaving limestone, 25 cents; 2,000 feet 3-inch drain tile ½ cents; 50 yards remacadamizing, 25 cents; 4,000 excavation, 1 cent; 7 remodeling catch-basins, $22.

Rock Island, Ill.—Contracts for paving two sections of Seventh avenue, and for the short strips on Ninth and Tenth streets were awarded July 19 as follows: Seventh, from Twelfth to Seventeenth, Flick & Johnson, $1.25 a square yard; Seventh, from Twenty-third to Thirtieth, Edwards & Walsh Construction company, $1.23; Ninth and Tenth streets, Edwards & Walsh Construction company, $1.08 a square yard for macadam and 39 cents a lineal foot for curbing. Purington repressed brick and Cleveland berea sandstone curbing will be used.

Saginaw, Mich.—The contract for paving Jefferson avenue, from Genesee to Holland avenue, was awarded July 5 to Chas. I. Williams of the Alcatraz Asphalt Co., Utica, N. Y., for $34,550.75. A bill was filed in the circuit court July 15 asking for an injunction restraining the board of public works and others from proceeding with the work. The bids for the work were received June 4, and Chas. I Williams' and other bids, were: John C. Davies & Co., $33,558.75; Barber Asphalt Paving Co., $41,620.50; Ayres Asphalt Paving Co., $43,074.50; Western Bermudez Co., $44,202.30.

Grand Rapids, Mich.—The contract for the first section of Plainfield avenue was awarded July 10 to Jno. McDermott for $14,530. The street will be paved with sapless cedar blocks on a concrete foundation and Medina stone curbing. The contract for paving Lyon street, from Canal to W. Division, with brick on concrete, was awarded to John Klute for $7,984. Bids were received July 17 for paving Jefferson and Madison avenues and Pearl street with asphalt from the Warren-Scharf Asphalt Paving company, of New York; H. M. Reynolds & Son, city; Ayres Asphalt company, Zanesville, O.; Jas. McDermott, city; Schillinger Bros., Chicago; Chas. I. Williams, Alcatraz asphalt, Utica, N. Y. The bids were referred to the city engineer to be tabulated.

Binghamton, N. Y.—The contract for paving Front street, from Main to North, with vitrified brick, was awarded to A. S. Webb of Syracuse, at $1.97½ a square yard. Bids were received July 19 for asphalt paving as follows: Washington street—Warren-Scharf Asphalt Paving company, $1.69 a square yard for a five-year guarantee; $2.35 for a ten-year guarantee; repairs for $1.25 for $1.69 a square yard for the different guarantee periods. Utica Paving company—$1.88 for a five-year guarantee; $2.25 for a ten-year guarantee, and repairs at $1.50 and $1.88 respectively. The bids received for Main street were the same, except the Warren-Scharf bid, $2.25 for a ten-year guarantee instead of $2.35. The awarding of the contracts was deferred.

Chicago, Ill.—(Special.)—Dillon & Conlan have been awarded the contract for all the grading for subways, street paving, building sewers, catch basins and manholes, new sidewalks and putting in new water pipes, in the track elevation of the Pennsylvania Railway company, from Fifty-fifth street to St. Lawrence avenue. The Morris Construction company was awarded the contract for the track elevation, July 12, and began work July 19. The work will be pushed as far as possible this year. The Morris Construction company will build all the retaining walls, the abutments at street crossings, the filling for track raising, the track raising and putting the iron in place over streets and crossings. The company's contract will amount to about $1,000,000.

Indianapolis, Ind.—The board of public works awarded contracts, July 21, for asphalt paving as follows: New Jersey street, from Thirteenth to Sixteenth, Indiana Bermudez Asphalt company, $3.14 a lineal foot, including cement combined curb and gutter; East street, from St. Clair to Tenth, Indiana Bermudez Asphalt company, $4.38 a lineal foot, including cement combined curb and gutter. The Germo-Kentucky Rock Asphalt company bid $4.39 on New Jersey street and $4.92 on East street; Warren-Scharf Asphalt Paving company, $4.12 and $5.45 respectively; United States Silica company, $3.45 for cement curb, $3.48 for stratified curb on New Jersey street, and $4.79 and $4.83 on East street.

Detroit, Mich.—The lowest bids received July 9 for cedar block paving on concrete were as follows: Pennsylvania avenue, H. L. Talbot, $5,582.23; Junction avenue, George E. Currie, $10,397.35; Ash street, G. A. Burch, $13,638.14; Baltimore avenue, Michigan Stone and Supply company, $8,035.94; Wabash avenue, section one, A. Grant, $1,213.47; Wabash avenue, Laurel street to Grand River avenue, A. Grant, $8,830.69; Twelfth street, James Grant, $9,33.19; Willis avenue, James Grant, $1,213.32; Theodore street, James Grant, $3,205.07. The contract for paving Jefferson avenue will probably be awarded to the Alcatraz Asphalt company.

Syracuse, N. Y.—Bids for paving S. Salina street with asphalt, asphaltina or vitrified brick have been received as follows: The Columbia Construction company, for asphalt, $8,246.85; Empire Construction company, New York Brick and Paving company, brick, $9,397.90; Asphaltina Construction company of Syracuse, asphaltina, $9,186.40; A. S. Webb, N. Y. B. and P. company, brick, $9,205.55; M. R. Grannis, Nelsonville block, $11,664.35; Warren-Scharf Asphalt Paving company, $11,219.75; Empire Construction company, Alcatraz asphalt, $9,388.90. University street, asphaltina: Asphaltina Construction company, at $19,791.30; for paving the same street with asphalt, the Columbia Construction company, $18,193.20; the Empire Construction company, $18,879.50, and the Warren-Scharf Asphalt Paving company, $19,343.60.

SEWERS.

SEWERS.

Spingfield, Mass.—A recent storm demonstrated the sewerage system of this city is inadequate and needs a thorough overhauling and enlarging.

Clinton, Mass.—The newly-appointed sewer commission held its first meeting in this city July 1, when the plans of the commission were discussed generally without definite decision being reached. The members present were the Hon. John W. Corcoran, the Hon. H. C. Greeley, C. L. S. Hammond, Geo. W. Morse and Julius A. M. Whittig.

Madison, Wis.—F. W. Springer and Chas.

Stickney of Wauwatosa and Chas. Lapham of Milwaukee were appointed members of the sewer commission July 22 by Governor Scofield. This commission was created by act of the last legislature to devise plans for a sewerage system for the Menominee and Kinnickinnic valleys in Milwaukee. The system will connect the cities of Milwaukee and Wauwatosa for sewer purposes and abate a nuisance in the Menominee and Kinnickinnic valleys which has been pronounced a menace to health in the way of dumping sewage into the streams.

Kansas City, Mo.—The construction of the sewer for the territory bounded by Twenty-third and Twenty-seventh streets, Grand avenue and Charlotte street is nearing completion. The work is being done by the R. J. Boyd Paving and Construction Co., and is quite unusual in character. It was necessary to tunnel through solid rock a distance of 350 feet. The workmen began at opposite sides of the hill and the two gangs met in the center of the hill. Two tons of dynamite were used in blasting the rock. A ravine was crossed by the sewer and a viaduct of masonry seventeen feet high was built there to carry it. The cost of the sewer will be between $6,000 and $7,000.

CONTEMPLATED WORK.

Lynn, Mass.—A sewer is contemplated for Hathaway-st.

Owosso, Mich.—Several sewers will be constructed this year.

St. Louis, Mo.—Sewers are badly needed in the Tower Grove and Oak Hill districts.

Taunton, Mass.—The Board of Trade has indorsed the plans for a sewerage system.

Cincinnati, O.—The State Board of Health has approved the Torrens road sewer plans.

Wheaton, Ill.—It is thought that about 27,000 feet of sewers will be built this season.

Mobile, Ala.—The question of constructing a sewerage system will be voted on Aug. 2.

Sharon Springs, N. Y.—The State Board of Health has approved plans for a sewerage system.

Bloomington, Ill.—About 4,800 feet of sewers will be laid this year. W. P. Butler, city engineer.

South Bend, Ind.—A pipe sewer has been recommended for Sample street, between Michigan and Main.

Sault Ste. Marie, Ont.—The question of constructing a sewerage system is being agitated.

Santa Monica, Cal.—A special election will be held Aug. 4, to vote on the proposition to issue sewer bonds.

Pana, Ill.—The construction of sewers is contemplated at an estimated cost of $66,000.

Miles City, Mont.—Plans and specifications have been prepared for a sewerage system for the state reform school.

Pittsfield, Mass.—An appropriation of $1,000 for sewer and water connection has been asked of the B. P. W.

Sewickley, Pa.—The Edgeworth Sewer Co. has been incorporated to build a sewerage system. Robert F. Shannon, treasurer.

Macon, Miss.—Plans and specifications for a sewerage system are being made by Sanders & Porter, of Louisville, Ky.

New Brighton, Pa.—The council accepted the plans for a sewerage system, July 8, but the system will not be built this year.

Clinton, Mass.—Edwin N. Rice has been engaged to look up the town records preparatory to establishing a sewerage system.

Iron Mountain, Mich.—The Board of Public Works has established a special sewer district on E. B street, from Madison to Stephenson avenue.

Ft. Wayne, Ind.—The plans for the Lakeside sewer are about completed. The sewer will be 1,750 feet long and will cost $9,000.

Lyons, N. Y.—The plans prepared by Alexander Potter, C. E., New York City, for a sewerage system, have been approved by the State Board of Health.

Millvale, Pa.—The borough engineer has been directed to furnish an estimate of a six-foot sewer to be laid in the bed of Girty's run.

Riverside, Cal.—Contracts will probably be let in August for constructing about 4,700 feet of lateral sewer, with manholes and flush tanks.

Steubenville, O.—A resolution was passed in the city council, July 19, for constructing a thirty-inch sewer on Seventh, South and Sixth streets.

Green Bay, Wis.—City Engineer Shaw has completed plans for a four-foot brick sewer on the West Side, from Elnore and N. Broadway to the Fox river.

Santa Ana, Cal.—The State Board of Health will recommend to the city trustees that immediate steps be taken to provide an adequate sewerage system.

Newport News, Va.—The question of extending the sewerage system is being considered by the commcn council. It is proposed to issue bonds for $80,000.

Buffalo, N. Y.—The board of public works is urging a better system of sewerage for the district drained by the Hampshire and Ferry street sewers.

Milwaukee, Wis.—The contract for constructing part of the tunnel and pumping works for flushing the Kinnickinnic river will probably be let this year.

Marshall, Mo.—An ordinance for the construction of public sewer No. 1 and district sewer No. 2 is being drafted and bids will be received soon.

Fall River, Mass.—The committee on sewers has recommended the construction of sewers in Beach, Albion, Buffinton, June and Warren streets and in New Boston road.

Evansville, Ind.—Resolutions have been passed for constructing a main sewer on Sixth avenue, from Delaware to Maryland streets. George W. Swearingen, clerk B. P. W.

Madison, Wis.—The sewer committee, composed of M. J. Hoven, McClellan Dodge, F. E. Turneaure and Allan D. Conover, recommends the disposal of sewage by broad irrigation.

Spencer, Mass.—The state board of health has aproved the site for the proposed sewage disposal plant, and furnishes specifications to be followed in the construction of the plant.

Colorado Springs, Col.—A joint outlet sewer for this place and Colorado City has been authorized by the city council in the form of an approval of an agreement for the joint construction of the sewer.

Orange, N. J.—The council is considering the question of ordering larger inlets made into the storm sewers along Parrow Brook, so that the water from the southern side of the city can be carried off more satisfactorily.

Ottumwa, Ia.—(Special.)—John T. Brady, city engineer, says 916 lineal feet of brick and stone sewers are contemplated for Birch street and along Blake's branch, and 3,000 lineal feet of 12-18 inch pipe sewers in several streets during 1897.

Newark, N. J.—Ordinances have been passed to third reading providing for a trunk sewer in Verona avenue, with branches in seventeen streets. Notice of intention has been published for the construction of a brick sewer in Bergen street, between Hawthorne and Peddie. Ordinances have been passed for pipe sewers in Adams, Warwick and Van Buren street and New York avenue.

CONTRACTS TO BE LET.

Carlinville, Ill.—(Special.)—Bids are advertised for 273 feet of five-foot double-ring brick sewer.

Lafayette, Ind.—Bids are asked until Aug. 9 for sewers in Second street. Thomas W. Burt, city clerk.

Des Moines, Ia.—Bids are asked until Aug. 3 for building sewers in several streets. Geo. C. Sims, B. P. W.

Hoboken, N. J.—Bids are asked until Aug. 4 for constructing a brick sewer in Adams street. M. V. McDermott, city clerk.

Corry, Pa.—Sealed proposals will be received until Aug. 9 for constructing sewers. G. D. Gilbert, city engineer.

Elizabeth, N. J.—Bids are asked until Aug. 2 for constructing 1,400 feet of sewers in Florida street. N. K. Thompson, street commissioner.

Rochester, Minn.—Bids will be received until Aug. 2 for constructing 1,438 feet of eight-inch sewer. G. McDermott, city clerk.

Creston, Ia.—Bids will be received until Aug. 2 for building about 1,900 feet of the W. Mills street sewer. S. A. Brewster, city clerk.

Lansdowne, Pa.—Bids will be received until Aug. 6 for constructing a sewer in Wycombe avenue, from Greenwood to Union avenue. H. L. Warren, secretary.

Huntsville, Ala.—Sealed proposals will be received until Aug. 5 for furnishing 56,000 lineal feet of sewer pipe. J. D. Humphrey, chairman committee on sewers.

Momence, Ill.—Sealed proposals will be received until Aug. 12 for constructing a main ditch and six branches in the Hopkins drainage district. W. F. Kenaga, commissioner.

Fargo, N. D.—Bids will be received until Aug. 2 for constructing a sewer in the alley in blocks 1, 2, 3 and 4 of Keeney & Devitt's addition. A. O. Rupert, city auditor.

Buffalo, N. Y.—Sealed proposals will be received until Aug. 5 for constructing tile and iron pipe sewers in Cambridge avenue, from Ferry to Northland avenue, and from Northland to Delavan avenue. R. G. Parson, secretary board of public works.

Spokane, Wash.—Bids were received until July 16 for constructing a sewer in Third avenue, from Madison to Cedar. An error in the specifications of which bids were asked resulted in their being rejected and new ones will be asked.

Cleveland, O.—Sealed proposals will be received until Aug. 6 for constructing a main sewer in Walworth street. Proposals will be received until Aug. 11 for constructing sewers in sundry streets and until Aug. 5 for sewers in three streets. George R. Warden, director public works.

CONTRACTS AWARDED.

Grand Rapids, Mich.—The contract for building a sewer in S. Waterloo street has been let to John Vaners for $818.50.

Yoakum, Tex.—G. A. Griffin secured the contract, July 17, to construct 3,080 feet of sewers for $1,294.

Wausau, Wis.—Krause & Goebel have been awarded the contract for constructing the main sewer for $12,108.

Calais, Me.—The contract for building the new sewers was awarded to Frank L. Allen of Worcester for $4,900.

Buffalo, N. Y.—The contract has been awarded W. G. Smith for sewers in Colorado street and Wyoming avenue.

Pelham Manor, N. Y.—The contract for constructing sewers has been awarded to Smith Bros. of North Pelham.

Somerville, Mass.—The contract for constructing a storm drain has been awarded to Daniel A. Dorey for $20,305.

Belfast, Me.—The contract for building city sewers has been awarded to F. E. Cottrell and H. J. Morrison of this city.

Stillwater, Minn.—The contract for constructing a sewer in W. Olive street has been awarded to Carlson & Aslund for $815.

Texarkana, Tex.—The contract for constructing a sewerage system has been awarded to the Grigsby Construction Co. of Dallas.

New Castle, Pa.—The contract for constructing the Allen street sewer has been awarded to J. Will Mitchell at 44 cents a lineal foot.

Topeka, Kas.—The contracts for sewers in sewer districts Nos. 18 and 19 have been awarded to L. Blackman for $1,546.50.

Concord, N. H.—John Walker of Newmarket was awarded the contract, July 6, for constructing the South End sewer for $16,712.40.

Cedar Falls, Ia.—K. A. Smith & Co. of Minneapolis, Minn., secured the contract for constructing a sewerage system for $3,150.

Macomb, Ill.—The Macomb Plumbing and Heating company secured the contract for laying the main sewer along Kill Jordon for $2,397.

Sherburn, Minn.—The contract for constructing 3,600 feet of sewer has been awarded to Frank E. Wade of Sheldon, Ia., for $1,560.

Solvay, N. Y.—The contract for constructing the sewerage system has been awarded to John W. Bustin of Syracuse for $24,910.

Butte, Mont.—The contract for constructing a sewer in Wyoming street, from Plantinum to Front, was awarded to C. A. Fider for $2,898.

Warren, O.—Campbell Bros., of Cleveland, O., are believed to be the lowest bidders, at $2,000, for constructing the West Side sewer.

Kansas City, Mo.—Sewer contracts have been awarded as follows: Sewer district No. 168, Michael Walsh, Kansas City, $3,989.70; sewer district No. 61, R. J. Boyd paving and construction company, Kansas City, $9,237.43.

Boston, Mass.—The contract for 4,135 feet of sewer construction in Melrose and Stoneham has been awarded to the Andrew W. Byrne Construction company for $9,042.

Hartford, Conn.—The contract for building the Maple avenue, Barnard, Benton and Whitmore street sewers was awarded to P. H. Harrison & Sons for $8,671.50.

Utica, N. Y.—The contract for constructing a pipe sewer in Kossuth avenue has been awarded to George E. Davis for $1,599.80; Fulton street, Michael Bennett, $203.20.

Waterbury, Conn.—Edward McManus has been awarded the contract for a sewer in Center street, from Leavenworth to Bank, at 62½ cents a lineal foot and $42 for each manhole.

Providence, R. I.—The contract for laying brick and pipe sewers in Doyle avenue was awarded July 16 to Fred E. Shaw, and in Wayne, Danforth and Matthews streets to Timothy F. Lyons.

Richmond, Ind.—William Rehling secured the contract July 16 for a sewer in Twenty-first street at 47 cents a lineal foot, and between Twelfth and Thirteenth streets at 85 cents a lineal foot.

Waukesha, Wis.—H. Hohensee secured contracts July 13 for a sewer in St. Paul avenue at 69 cents a lineal foot, and Lincoln avenue at 54 cents a lineal foot.

Reading, Pa.—The contract for constructing a storm water sewer on Second street, from Greenwich to Douglass, and on Douglass, from Second to Front, was awarded to Hawman Bros. for $6,452.26.

Frankfort, Ind.—Sewer contracts have been awarded as follows: Snipe Run sewer, C. H. Condon, $1,636.30; E. Clinton street, $2,063.32, and Armstrong street, $2,836.70, E. Nicholson, Kalamazoo, Mich.

New Orleans, La.—(Special.)—The National Contracting company secured the contract for building the second section of the drainage system, for $1,257,055.32, with electric installation, and $988,407 with steam installation.

Cohoes, N. Y.—The contract for constructing the main tunnels of the new sewerage system was awarded to the Warren-Scharf Asphalt Paving company of New York City, who submitted two bids, one for $84,365.29 if dry and $11,592.29 if a wet tunnel is to be dry.

Ripon, Wis.—The contract for constructing a sewer was awarded July 13 to Sargent & Holland, as follows: 12-inch pipe, 500 feet, 41 cents; 15-inch pipe, 3,400 feet, 41 cents; manholes, per plan, 10, $31; iron rings, 250, 50 cents; embankment per cubic yard, 1,000 yards, 30 cents.

Salem, O.—Bids were received July 6 for constructing 3,800 feet of sewer in Lincoln avenue, as follows: Samuel Buell, Salem, O.; $2,998.40; Burt & Game, Salem, O., $3,084.89; John Hadley, Canton, O., $3,753.06; G. W. S. Lucas, Salem, O., $3,174.76.

Galesburg, Ill.—The contract for constructing the Seminary street sewer has been awarded to Jas. D. O'Connor as follows; 592 lineal feet, 18-inch pipe, 80 cents; 994 lineal feet, 15-inch pipe, 65 cents; 1,082 lineal feet, 12-inch pipe, 55 cents; 6 manholes, $32; 10 catchbasins, $22; 10 inlet wells, $6.

Gloucester City, N. J.—Contracts for the construction of pipe sewers were awarded July 15 as follows: Reeves & West, city, 12-inch pipe, 42½ cents lineal foot; 15-inch pipe sewers, 57 cents lineal foot, and inlets and connections, $13.50; Wm. Black, Jr., Gloucester, 15-inch pipe, 57 cents lineal foot; 18-inch pipe, 66 cents lineal foot, and manholes, $17.

Decatur, Ill.—Sewer contracts have been awarded as follows: Between Orchard and Condit streets, from Jasper to Woodford, Decatur Plumbing and Heating company, 42 cents a lineal foot; between Hickory and Division, from Warren to Broadway, R. F. Kincaid, 38 cents; between Herkimer and Waggoner, from Warren to Broadway, R. F. Kincaid, 37 cents; between N. Morgan and Broadway, from Division to Lincoln avenue, H. S. Gebhart, 43½ cents.

Milwaukee, Wis.—The contracts for constructing sewers were awarded, July 14, as follows: G. E. Zimmerman, Milwaukee, 310 feet 18-inch, and 15 feet 15-inch pipe sewer, 72 cents per lineal foot; J. C. Brand, Milwaukee, 297 feet 18-inch, 297 feet 15-inch, 298 feet 12-inch, 79¾ cents per lineal foot; F. H. Nakielski, Milwaukee, 12-inch pipe sewer, 63 cents per lineal foot; M. Chybowski, Milwaukee, 346 feet 12-inch pipe sewer, 70 cents per lineal foot.

Hackensack, N. J.—Bids were received, July 12, for constructing brick and pipe sewers in Main street, and Elm and Spring Valley avenues, as follows: Patrick T. Plunkett, Jersey City, $47,421.81; Chapman & Fitch, New York City, $49,171.93; S. W. Frescoln, Reading, Pa., $53,409.12; P. H. Harrison & Sons, New York City, $60,224.05, Henry & McGivney, Jersey City, $68,825.35; Eyre & Wallace, Chester, Pa., $82,574.62; Frederick R. Pratt, Newark, N. J., $101,835.04.

WATER-WORKS.

Belleville, Ill.—The Belleville Water Works company has been sold to the Leschen Water company for $125,000.

Waukesha, Wis.—The Waukesha water works were sold June 19 to the American Pipe Manufacturing company of Philadelphia.

Ft. Scott, Kan.—The Ft. Scott Water company's plant was sold at auction July 6 under a foreclosure of mortgage for $141,000.

Cedar Rapids, Ia.—A municipal laboratory, equipped with analytical instruments for analyzing water, food, etc., will be established in this city.

Ottumwa, Ia.—The plant and property of the Iowa Water company in this city was sold recently at mortgage sale for $75,100 to the bondholders' committee.

Indianola, Ia.—Judge Applegate decreed a perpetual injunction against this city against carrying out its purpose of purchasing the water plant subject to the mortgage of $29,000.

Reading Pa.—The water commissioners and the filtration committee of councils left the city July 20 on a week's inspection tour, to investigate the filtration plants in a number of cities.

Philadelphia, Pa.—John C. Trautwine, jr., chief of the bureau of water, has ordered 3,000 square yards of the asphalt lining in the Queen Lane reservoir relaid. The lining used was not of sufficiently dense material.

Des Moines, Ia.—The Des Moines Water Works company has been reorganized with the following new officers: President, John A. Cole, Chicago; treasurer, J. G. Rounds, city; directors, John A. Cole of Chicago, George E. Bird; ex-Governor Frederick Roble, president of the First National bank; William M. Bradley; William G. Davis, president of the National Traders' bank; George R. Richardson, all of Portland, Me.

Denver, Col.—In the suit against the Den-

ver Union Water company, in which the city entered charges against the company's overcharges to water consumers, its refusal to fix schedule rates, and its failure to supply good and wholesome water, Judge Le Fevre decided in favor of the water company. A special bill of exceptions has been filed to the ruling.

Rockville, Md.—A petition is being circulated asking the town council to employ another engineer to determine who is responsible for the defect in the new water tower, which is out of plumb and in danger of falling over. Rosser & Castol of Bellaire, O., the contractors, claim that they followed the specifications to the letter in building it, while Engineer Morgan of Chicago claims it was not completed in accordance with the specifications.

CONTEMPLATED WORK.

Voted to construct water works; Marathon, N. Y.; Wurtsboro, N. Y.

Sharpsburg, Pa.—An effort will be made to improve the water supply.

Ft. William, Ont.—This town voted in favor of water works July 9.

McComb, Miss.—Plans are being prepared for a water works system.

Allegheny, Pa.—The councils are considering a plan for extending the water system.

Stanley, Wis.—This village has voted to lay a system of water mains through the principal streets.

New Britain, Conn.—It is thought that bids will soon be asked on the Roaring Brook water supply.

Tamaqua, Pa.—The question of increasing the debt $50,000 for an addition to the water works is contemplated.

Macon, Ga.—A new pumping station will be built on the Ocmulgee river by the Macon Gas Light & Water Co.

Huntsville, Tex.—The city council passed an ordinance, July 19, directing the issue of $12,500 water works bonds.

Millerstown, Pa.—A survey has been made for the proposed water works by A. H. Holcombe, city engineer of Philadelphia.

Ottumwa, Ia.—(Special.)—John T. Brady, city engineer, says about three miles of water mains will be laid during 1897 on numerous streets.

Wauwatosa, Wis.—The common council is considering a proposition to bond the city for $50,000 to construct a water works system.

Cincinnati, O.—Engineer Beuscaren has been directed to prepare plans for the necessary pumping engines for the low service station.

Glens Falls, N. Y.—The question of putting in two filters at the water works is being considered by the board of trustees. E. B. Potter.

Idlewild, Tenn.—J. A. Goodwin, Mayor, has been appointed chairman of a committee of five to investigate the question of establishing water works and sewerage systems.

Lincoln, Neb.—A committee, consisting of Messrs. Mockett, Lawlor, Schroeder, Woods, Finley and Woodward, has been appointed to investigate the question of securing a larger water supply.

Summit, Miss.—The water works commission, in its report to the mayor and council, says that as far as it has gone it thinks a first-class water works system can be put in for $15,000.

Baltimore, Md.—N. S. Hill, jr., chief engineer of the water department, is preparing plans for the proposed standpipe at West Arlington, as part of the extension of the water supply.

Philadelphia, Pa.—Director Thompson will start about Aug. 1 on a tour of the cities where filtration plants are in operation preparatory to the establishment of a filtration plant in this city.

The water works question will be voted on at the following places: Madisonville, Ky.; Huntingdon, Tenn.; Holly Springs, Miss., Aug. 9; Rock Valley, Ia.; Northwood, Ia.; Mobile, Ala., Aug. 2; Mifflinburg, Pa., Aug. 7.

The construction of water works systems is contemplated at the following places: West Salem, Wis.; Melrose Park, Ill.; Sunbury, O.; Pascagoula, Miss.; Camilla, Ga.; Roxboro, N. C.; Renovo, Pa.; St. Mary's, Ont.; Metamora, Mich.; Camden, S. C.; Jerome, Cal.; Georgetown, Del.; Beeville, Tex.; Augusta, Ill.; Milledgeville, Ill.; Camden, S. C.; Jackson, Ga.; Lawrenceburg, Tenn.; Odell, Ill.; Ward, Col.

Augusta, Ga.—A committee has been appointed by the city council to take charge of the work of changing the source of supply and the location of the reservoir so as to give the city gravity pressure, and to construct a filtration plant. Daniel Kear, Charles Estes, Jacob Phinozy, W. A. Lattimer, Charles E. Doolittle and William B. Young have been appointed water commissioners.

CONTRACTS TO BE LET.

Audubon, Ia.—Bids are asked until August 2 for erecting a water tank and brick tower. H. W. Hanna, mayor.

Astoria, Ill.—Bids are asked until August 2 for constructing a system of water works. C. H. Bowles, city attorney.

Siloam Springs, Ark.—Bids are asked until August 10 for the construction of a water works system. W. H. Davey, secretary.

San Francisco, Cal.—Bids are asked until September 20 for a new water supply. John A. Russell, clerk board supervisors.

Albany, N. Y.—Bids are asked until August 3 for repairing two condensing beam pumping engines. Geo. I. Bailey, superintendent water works.

Bangor, Me.—Bids are invited until August 9 for hoisting machinery for head gates for the water works. W. I. Brown, clerk water board.

Westfield, Mass.—Bids will probably be asked in August for an increased water supply from Granville. O. E. Parks, city engineer.

Brooklyn, N. Y.—Bids are asked until August 4 for furnishing and erecting one pumping engine, of 3,000,000 gallons capacity. Theo. B. Willis, commissioner city works.

Chicago, Ill.—Sealed proposals will be received until July 20 for the construction of a steel trestle and tank at Ft. Sill, O. T. G. J. C. Lee, assistant quarter-master, U. S. A.

St. Paul, Minn.—Sealed proposals will be received until August 16 for moving and resetting the 2,000,000 gallon pumping engine at McCarron's Lake pumping station. Matt Jersen, city clerk.

Cleveland, O.—Bids are asked until August 6 for the erection of water tube or return tubular boilers, mechanical stokers and conveyor and smoke flue, together with brick work. Geo. R. Warden, director public works.

Olathe, Kan.—Sealed proposals will be received until August 12 for furnishing and laying cast iron water supply pipe from the present standpipe easterly to the supply reservoir. S. C. Wheeler, secretary board of trustees state charitable institutions.

CONTRACTS AWARDED.

Augusta, Wis.—A franchise for the construction of water works has been granted J. L. Bull.

Freedom, Pa.—The contract for constructing water works has been awarded to Cronin & O'Herron of Pittsburg.

Fostoria, O.—Henry R. Worthington secured the contract for a pump for the city sewage disposal plant for $25,024.

Norwalk, O.—(Special.)—The contract for water works pipe extension was awarded June 22 to the Shaw Kendall Co. of Toledo, O.

Port Leyden, N. Y.—The contract for constructing water works was awarded to J. J. Siegrist of Utica, N. Y., for $15,100.

Cottonwood, Minn.—The contract for constructing a water works system was awarded to Fairbanks, Morse & Co. of St. Paul for $2,400.

Altoona, Pa.—The contract for paving the water channel was awarded June 30 to W. G. Stall & Sons of this city for $35,857.

Gibsonburg, O.—The contract for building a water works system was awarded June 23 to W. D. Boyce & Co. of St. Louis for $21,250 complete.

Flushing (L. I.) N. Y.—The New Jersey Steel & Iron Co., Trenton, N. J., was awarded the contract July 14 for erecting a steel standpipe for $11,892.

Chester, S. C.—The contract for constructing a water works system was awarded to Guild & White of Chattanooga, Tenn., for $26,778.42.

Wauseon, O.—The contract for constructing a system of water works was awarded July 14 to C. & T. Iglehart of Chicago for $18,998.

Minneapolis, Minn.—The contract for constructing a water conduit and pumping station has been awarded to F. A. Gillespie Bros. Co. of Pittsburg, Pa., for $400,000.

Boston, Mass.—The contract for laying water pipes in portions of section 9 was awarded June 24 by the metropolitan water board to E. W. Everson & Co. of Providence, R. I., for $16,639.25.

Holland, Mich.—The contract for constructing a standpipe and foundations was awarded July 7 to the Muskegon boiler works of Muskegon as follows: Standpipe, $4,215; foundation, $445.

North Woodstock, N. H.—The contract for furnishing and laying about 8,300 feet of eight-inch and 6,400 feet of six-inch cast iron pipe, building a stone dam, etc., was awarded July 12 to Andrew Smith of Plymouth, N. H., for $9,254.94.

BRIDGES.

Rochester, Minn.—A steel bridge across Bear creek is proposed.

Salem, Ore.—A county bridge is contemplated across the Santiam river at Mehama.

Kingston, Mo.—Bids are asked until Aug. 2 for building three iron bridges. Dave Stucke Braymer.

Mt. Morris, N. Y.—The citizens of this town and Leicester have voted in favor of an iron bridge.

Snowcamp, N. C.—A new iron bridge will be constructed across Cane creek by the Dixon Woolen Mill company.

Slatington, Pa.—The construction of a new iron bridge across Front creek is contemplated. Frank Jacobs.

Clarksburg, W. Va.—The county commissioners propose to build a bridge across the river at Enterprise.

Dallas, Tex.—The question of constructing a bridge across Trinity river, near Corsicana, is being agitated.

Frankfort, Ind.—Bids are asked until Aug. 4 for constructing a steel bridge. A. J. Hammond, city engineer.

Kingston, Mo.—Contracts will be let Aug. 2 for the construction of three iron bridges and one wooden bridge.

Jefferson City, Mo.—Bids are asked until Aug. 6 for constructing a 600-foot steel bridge. F. W. Roer, county clerk.

Middletown, O.—A new iron bridge is contemplated to take the place of the old wooden structure across the Miami.

Charlottesville, Va.—A new iron bridge across the Rivanna river, near this city, is proposed. John T. Antrim, interested.

Waynesville, Mo.—The contract will be let Aug. 5 for rebuilding the McCain bridge. W. J. Barrows, county surveyor.

Wabash, Ind.—The citizens of Lagro township will petition the county commissioners for a new bridge over Lagro creek.

Ft. Scott, Kas.—Bids will be received until Aug. 5 for the stone work excavation, concrete and fill for four bridges. H. Frankenberger.

Langdon, N. D.—Bids are asked until Aug. 16 for building a bridge across Pembina river at Langin crossing. Robert Work, county auditor.

Richmond, Tex.—Bids are asked until Aug. 10 for building a steel bridge over the Bayou at this place. J. S. McEachin, county judge.

Dayton, O.—The question of constructing a 150-foot bridge on the Wagner Fork road is under consideration. F. M. Turner, city engineer.

Ottumwa, Ia.—(Special.)—John T. Brady, City Engineer, says one iron bridge, and perhaps two, will be built at a cost of $3,000 each.

Titusville, Pa.—The Wrought Iron Bridge company, Canton, O., secured the contract for building the approach to the Brown street bridge for $1,976.

Franklin, Wis.—Bids are asked until Aug. 4 for constructing a steel highway bridge over Root river. A. F. Zentner, county clerk, Milwaukee.

Cincinnati, O.—Sealed proposals will be received until Aug. 11 for a semi-circular arch culvert on Amity road. Fred Bader, president board of county commissioners.

Blountville, Tenn.—The county commissioners contemplate building a new iron bridge over the Holston river at Childress' Ferry; estimated cost, $8,000.

Independence, Mo.—Contracts will be let

Aug. 2 at public outcry for the construction of one iron and two wooden bridges. Thomas F. Callahan, county surveyor.

Brunswick, N. H.—The selectmen of this place were considering the question of building an iron bridge over Paul's stream to replace the old wooden structure.

Saratoga, N. Y.—The contract for constructing a steel bridge at this place has been awarded to the Wrought Iron Bridge company of Canton, O., for $14,480.

Yorkville, S. C.—The county commissioners have ordered an election for Aug. 10 to vote on building an electric and steel bridge across the river. Commissioner H. W. Miller.

Benton, Ill.—Sealed proposals will be received until Aug. 12 for building a stone culvert over the ravine at Bull bridge. B. E. Simons, member commissioners of highways.

Worcester, Mass.—The aldermen of Ward 4 are said to be determined in their efforts to have a steel bridge for the Lake Quinsigamond causeway. James H. Mellen interested.

Madisonville, Ky.—The construction of a 270-foot iron truss bridge across Pond river is contemplated by Hopkins and McLean counties. Capt. J. C. Bacon, Madisonville, chairman committee.

Le Mars, Ia.—The boards of supervisors between this and Union county, S. D., will probably select a site during the September meeting for the proposed bridge across the Big Sioux.

Brooklyn, N. Y.—The board of aldermen voted, July 12, to build a high level bridge over Newton creek at Vernon avenue, in Long Island City, instead of a bascule bridge.

Chicago, Ill.—Sealed proposals will be received until Sept. 8, for four bridges along the line of the main drainage channel. Thomas Kelly, president sanitary district of Chicago.

Dickinson, N. D.—Plans, specifications and bids will be received, Aug. 2, for constructing three wood, iron or combination bridges; certified check, $200. G. J. DeFrance, county auditor.

Oakland, Md.—The Wrought Iron Bridge company of Canton, O., secured the contract, July 8, for building an iron bridge over the Youghiogheny river at Friendsville, for $2,050.

Battle Creek, Mich.—(Special.)—John Elsmere, city engineer, says the council has passed a resolution to have the recorder advertise for plans for a bridge over the Kalamazoo river at S. Jefferson street.

Sigourney, Ia.—Bids are asked until Aug. 19 for constructing an iron bridge across South Skunk river, between Keokuk and Mahaska counties. A Stranham, auditor Keokuk Co.; J. B. Cruzen, auditor Mahaska Co.

STREET CLEANING AND SPRINKLING.

Clayton, N. Y.—The board of trustees has decided to purchase a street sprinkler.

Utica, N. Y.—The contract for collecting the garbage for one year was awarded to Emmett J. Hurley for $6,245.

White Plains, N. Y.—J. F. Crawford secured the contract for collecting the garbage for one year for $1,116.

Sioux City, Ia.—This city will effect a saving of nearly $6,000 this year by cleaning its streets with hand scrapers.

Toledo, O.—Samuel M. Jones, mayor, wishes to correspond with manufacturers of garbage disposal plants, materials, etc.

Camden, N. J.—The contract for cleaning the city's streets for the coming year was awarded to B. F. Sweeten & Son, July 7, for $15,000.

Houston, Tex.—H. T. Keller and Dr. Geo. Larendon have been appointed a committee to consider with Mayor Rice the feasibility of establishing a garbage crematory.

Milwaukee, Wis.—The contract for the collection and disposal of garbage has been awarded to Crilly & McDonald for $274,500. The Holthaus system was adopted.

New York, N. Y.—Col. Waring has adopted the plan followed last year, that of cleaning the asphalt paved streets by flushing at night with water instead of sweeping them.

Chicago, Ill.—Sealed proposals will be received until Aug. 24 for constructing a garbage crematory at Ft. Leavenworth, Kas. J. G. C. Lee, Asst. Q. M. G. U. S. A.

Grand Rapids, Mich.—A committee from the common council visited Washington, D. C., and other cities to investigate the various systems of garbage burners.

Covington, Ky.—The plan of cleaning the asphalt streets by flushing them was given a test July 12, and it is possible that that plan will be adopted.

Albany, N. Y.—The Albany Reduction Co. bid, July 6, for the removal and disposal of garbage, as follows: Per year, $23,700; for five years, $118,780; for ten qears, $237,500.

Newton, Mass.—The attention of the board of health has been called to the practice of the highway department in conveying the contents of the catch basins through the city streets in open carts.

Cleveland, O.—The Buckeye Refuse Destruction Company has been incorporated to collect, treat and dispose of garbage and other waste, by W. D. Kernish, Franklyn B. Sanders and T. S. Gerhard.

Spokane, Wash.—The board of health has passed resolution indorsing the establishment of a crematory and asking the city council to investigate its merits. The estimated cost of the crematory is $15,000. Dr. Libby, member board of health.

New York, N. Y.—The Connecticut Reduction Co. has been incorporated to collect and reduce garbage, refuse matter and manufacture the same into fertilizer. The directors of the company are Edson Pearsall, John Ryan, A. M. Poole, Harkort Napier and A. A. McGlashan of this city.

St. Paul, Minn.—The Ladies' Local Municipal Improvement Association has done much in the way of suppressing nuisances and beautifying the streets. Branch organizations will be founded in different sections of the city and it is believed that much good will be accomplished this year. Mrs. J. L. Forepaugh is chairman of the association and Mrs. Charles Dibble secretary.

Los Angeles, Cal.—The joint committee of the Chamber of Commerce, the Merchants' and Manufacturers' Association and Board of Trade, consisting of Chas. Forman, J. W. McKinley, J. D. Hooker, Frank Coulter, E. B. Cass, H. Jevre, H. W. Frank, E. A. Beardslee and L. W. Godin, are considering plans for urging the council to properly clean the streets in the businss portions of the city.

Boston, Mass.—Mayor Quincy has not yet given up the hope that this city will, in the near future, have a municipal plant for disposing of its garbage and offal in some other way than by scowing it down the harbor and dumping it into the open ocean. Together with the special committee appointed to investigate the subject, he is considering new methods for the destruction or utilization of garbage. The committee is composed of City Engineer Jackson, Dr. Durgin, Benjamin J. Wells and Deputy Superintendent O'Shea of the sanitary division.

Chicago, Ill.—Contracts for the removal of garbage were awarded, July 1, by Superintendent Fitzsimmons of the street and alley cleaning bureau, at a net saving of nearly 50 per cent. over last year. The contract began July 1 and ends Dec. 31, 1897. The successful contractors were H. P. Downey, M. P. Butler, Pat Mulcaire, M. Murphy, W. H. Clark, Peter Kelly, Geo. C. Lenke, John O'Brien, W. H. McAuliff, Baumgarten & Nelson, H. P. Jansen & Co., Gilbert Coyne, Michael Doyle, Schendorf & Busse, John S. Cooper, John Collins, John Connors, M. Harrington and Thos. R. Maroney.

PARKS.

New York, N. Y.—Plans have been drawn for new parks on the East Side.

Cannon City, Col.—The establishment of a public park is contemplated.

Lexington, Ky.—This city is in need of a park, and a project has been started to make one of the water works grounds.

Des Moines, Ia.—The main improvement to the city parks this year has consisted in the construction of water works system for Greenwood, Waveland and Grandview.

Jamaica, (L. I.) N. Y.—The town trustees have purchased property for a public park. The purchase was made within four hours after the vote favoring it was announced.

Trinidad, Col.—The citizens are agitating the question of a city park, and it is probable that a site on the south side of the river will be selected for the purpose of establishing a park.

Chicago, Ill.—The Free Bath and Sanitary League is endeavoring to persuade the park commissioners to erect shelters, something on the order of a Chinese padoga, in the various parks, as a protection against rains.

San Francisco, Cal.—The executive committee of the Precita Valley Improvement Club has been instructed to interview the Supervisors' Financial Committee regarding an appropriation for the improvement of Bernal Park.

Washington, D. C.—The citizens of Columbia Heights have asked that a plot of land at the corner of Fourteenth st. and Columbia road be set aside for park purposes. Dr. Gibbs is chairman of the Columbia Heights Citizens' Association.

St. Louis, Mo.—A bill will be introduced in the council proposing a plan for constructing down the middle of Twelfth st., between St. Charles st. and Clark ave., a long narrow park, bordered by shade trees, and driveways in either side. The plan is said to be endorsed by Mayor Ziegenheim.

TOO LATE FOR CLASSIFICATION.

Lonaconing, Md.—The council has decided to purchase a stone crusher and engines.

Glenville, O.—An ordinance was passed July 22, to ask for bids for a sewerage system.

Oxford, Ala.—The city council has appointed a committee to investigate the water works question.

Columbus, O.—Action is urged in relieving sections of the West Side by the disposal of the storm water.

Chester, Pa.—The council is considering an ordinance which was introduced, July 19, for a sewer on Morton avenue.

Kansas City, Mo.—Superintendent Longwell urges the purchase of five or six additional engines for the water works.

Spokane, Wash.—The advisability of erecting a bridge over Deep creek is being considered by the county commissioners.

Warren, O.—A resolution was passed July 23, to pave Riverside alley with brick on concrete. Albert E. Andrews, city clerk.

Manistee, Mich.—A committee from the council has been appointed to confer with the water company relative to purchasing its plant.

Los Angeles, Cal.—The city engineer has been instructed to prepare plans and specifications for the proper ventilation of the outfall sewer.

Baltimore, Md.—Sealed proposals will be received until Aug. 4, for paving Durham, Girard, Pulaski and Payson streets. W. A. Hanway, city commissioner.

Wilmington, Del.—The street and sewer department has decided to expend most of its available funds in the construction of sewers.

Iowa City, Ia.—Thos. Hanlon was the lowest bidder, July 2, for constructing small sewers and the contract will probably be awarded to him.

Waco, Tex.—The city council has authorized the mayor to purchase a tract of land in the northern part of the city to be converted into gravel pits.

Youngstown, O.—Sealed bids will be received until Aug. 17, for the substructure of a bridge over the Mahoning River at Market st. C. F. Brenner, County Auditor.

Grand Island, Neb.—An ordinance is before the council providing for the construction of none but permanent sidewalks in any part of the city. Tiling sidewalks are favored.

Marion, Ind.—Sealed proposals will be received until Aug. 10 for constructing sixteen catchbasins, 5,000 feet of 12-in and 3,000 feet of 10-in drain tile. Jas. I. Beatty, City Clerk.

Lincoln, R. I.—The question of purchasing a stone crusher was placed in the hands of Highway Surveyor F. P. Manchester and Councilman Lockwood, July 22, with power to act.

Brooklyn, N. Y.—It is thought that the plans and specifications for the steel towers for the new East River bridge will be ready so that bids can be advertised about Aug. 5.

Philadelphia, Pa.—Ordinances were approved July 16, for constructing sewers in about fifty-four streets and alleys, and for grading twenty-two streets and avenues. Chas. F. Warwick, Mayor.

Hartford, Conn.—Bids will be received until Aug. 4 for paving Asylum st., from Main to Ford, with block asphalt on concrete, and Church st., from Main to Trumbull, with asphalt.

St. Paul, Minn.—An ordinance has been adopted providing for paving as follows:

Asphalt on concrete, Broadway, from Prince to Fourth st., sandstone on concrete, Broadway, from Third to Prince and from Fourth to Seventh.

St. Louis, Mo.—The Board of Public Improvements approved thirty-one ordinances for street improvements, at an estimated cost of $200,000, July 24. S. Broadway, between Miami and Arsenal sts., will be paved with granite blocks.

Buffalo, N. Y.—The Barber Asphalt Paving Co. was awarded the contract, July 24, for paving Illinois st., between Scott st. and the docks, for $9,990, and the Standard Paving Co., Ohio st., between Illinois and Michigan, for $5,480.

Galesburg, Ill.—Contracts were awarded, July 22, for brick paving, as follows: Knox and Lombard streets, Nelch, Patterson and Striffler, $30,820.15; N. Seminary street, Edwards & Walsh, $31,917.50. The contract for constructing the North street bridge was awarded to J. B. McAuley, for $1,333.55.

Springfield, Mo.—Bids were received, July 23, for macadamizing E. Elm street, which ranged in prices from 77 cents to $1.00 and ½ cents a lineal foot. The bids were referred to the street committee. Bids will be advertised at once for paving Benton avenue, from Commercial to Center street, with macadam.

Middletown, O.—Sealed proposals will be received until Aug. 19, for constructing sewers in Second and Main streets. L. Martin, clerk board sewer commissioners. A resolution was passed, July 23, to pave Third street from the Great Miami river to Clinton street, with brick, and set and reset curbing and gutter. J. V. Bunnell, clerk council.

Erie, Pa.—The contract for catch basins, spills and repairs of sewers was awarded, July 22, to John Thornton, as follows: Catch basins, $14; inlets, $1, and manholes, $5. P. J. Wissler was awarded the contract for paving a portion of Ash street, at 74 cents a square yard, including grading, graveling and hauling the stone. The city will furnish the paving material.

Providence, R. I.—(Special)—Richard H. Tingley, Civil Engineer of Pawtucket, R. I., has been appointed engineer of the State Boundary Line Commission on the part of the State of Rhode Island. This commission is to act in conjunction with a similar commission on the part of Massachusetts, to adjust and re-establish the boundary line between the states.

Chicago, Ill.—The Union League Club has assumed the expense of paving the government's half of the block on Jackson boulevard, between Dearborn and Clark sts., in front of the postoffice and custom house site. The Bermudez Asphalt Company is paving the street with asphalt. Information had been obtained to the effect that the government would not be ready to consider its portion of the street until the postoffice structure was completed, which would be in three years.

Omaha, Neb.—The lowest bid presented July 23, for paving Center st. was by the Grant Paving Co., at 89 cents a square yard for macadam and $1.25 for guttering. The other bidders were H. B. Smith, Hugh Murphy, Barber Asphalt Paving Co., Omaha Building and Construction Co., Iowa Brick Co., John M. McGowan and VanCourt & Winn. Hugh Murphy presented the lowest bid for curbing, 50 cents a lineal foot, for Colorado sandstone. Bids were also received for sewer construction, but it will take some time to ascertain the lowest bidder.